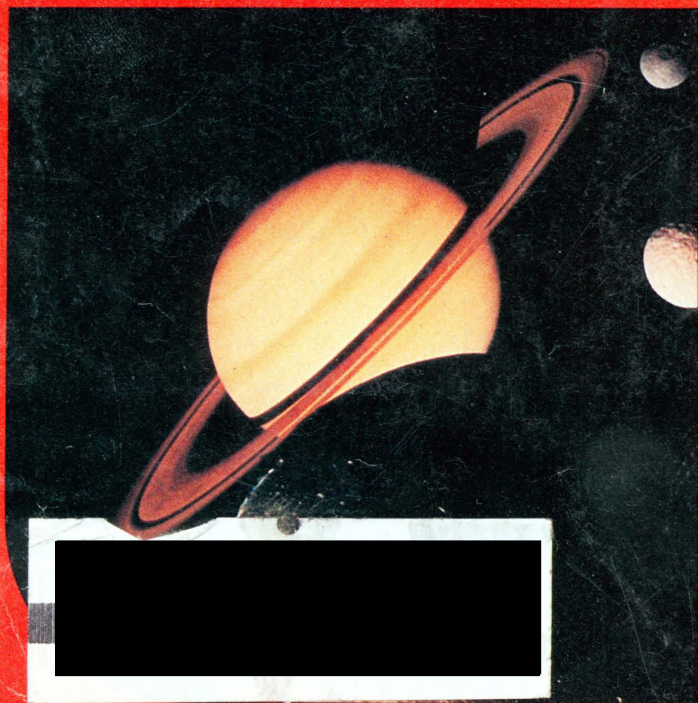


# 321 CONTACT™

## Inside: The Return of Superman!







Fireworks are not just for the Fourth of July. For hundreds of years, people all over the world have been celebrating special events by setting off fireworks.

Who are the experts that create these beautiful bursts of color? You can meet an entire family of fireworks makers. Just turn to page 16.

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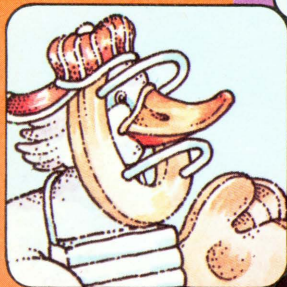
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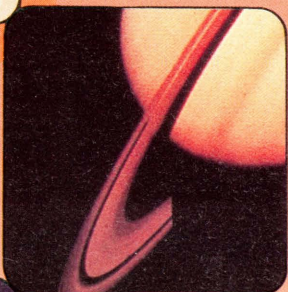
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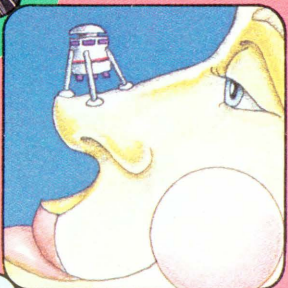
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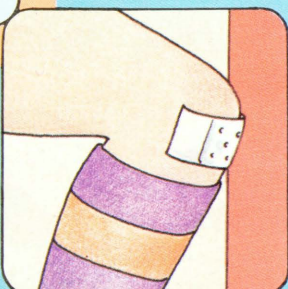
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# 321 CONTACT


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A full-page photograph of Superman in flight, wearing his iconic blue suit with a red and yellow 'S' shield, a red cape, and a yellow belt. He is flying towards the right against a dark background.

In 'Superman II,' the Man of Steel battles three super-villains from the planet Krypton.

# SUPERMAN

Look! Up on the screen! It's a bird. It's a plane. It's SUPERMAN!

Wrong! It's *Superman II*. America's favorite super-hero has returned in a great new movie.

This time around there's good and bad news. The good news is that Superman will again be joined by Lois Lane, Perry White and Jimmy Olsen. The bad news is that arch-villain Lex Luthor has returned, too.

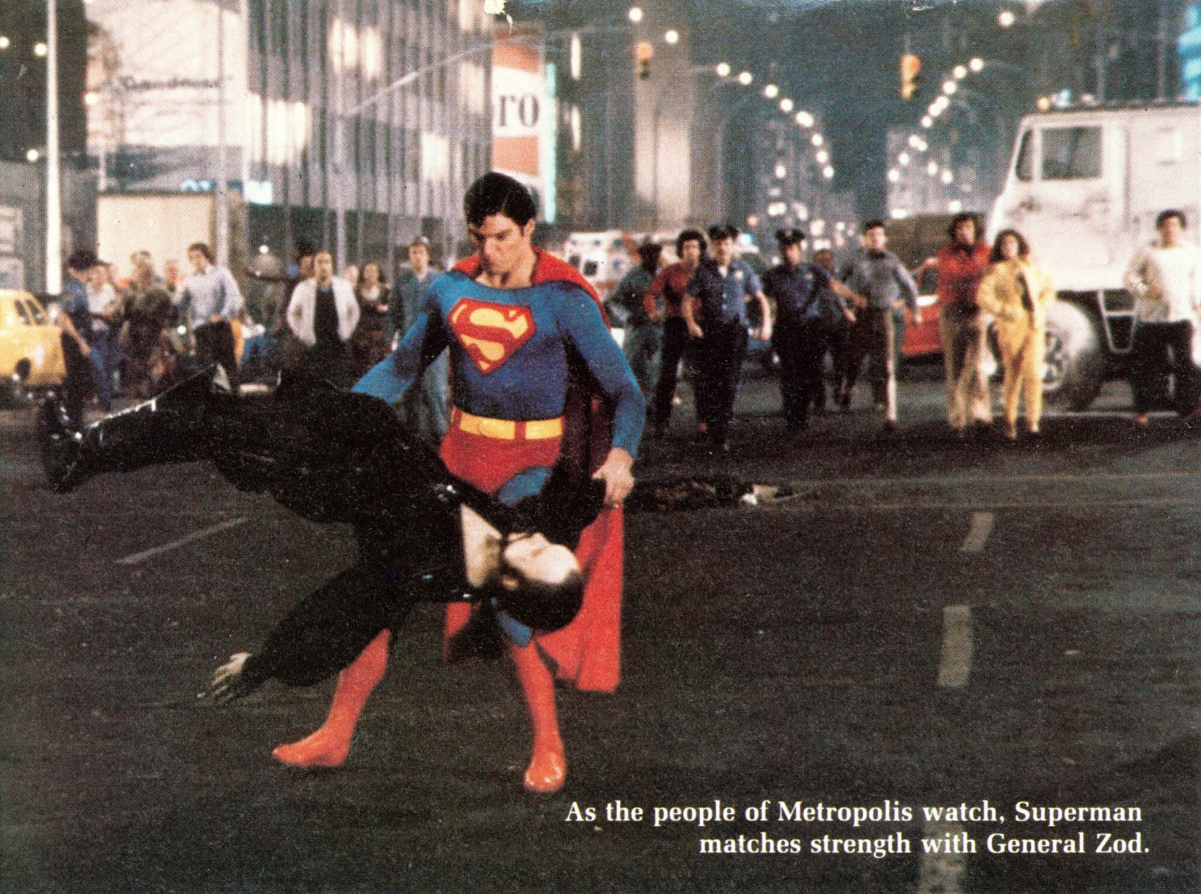
The even worse news is that there are three new villains ready to tangle with Superman. The evil General Zod and his sidekicks, Ursa and Non, have arrived on earth. They have powers equal to those of the Man of Steel. They also have a plan to rule the world!

Can Superman defeat this terrible trio? Can he keep the city of Metropolis from being destroyed? Can he return Lex Luthor to the jail where he belongs? You'll have to see the movie to find out. In the meantime, to find out a little about real-life super powers on earth, turn the page.

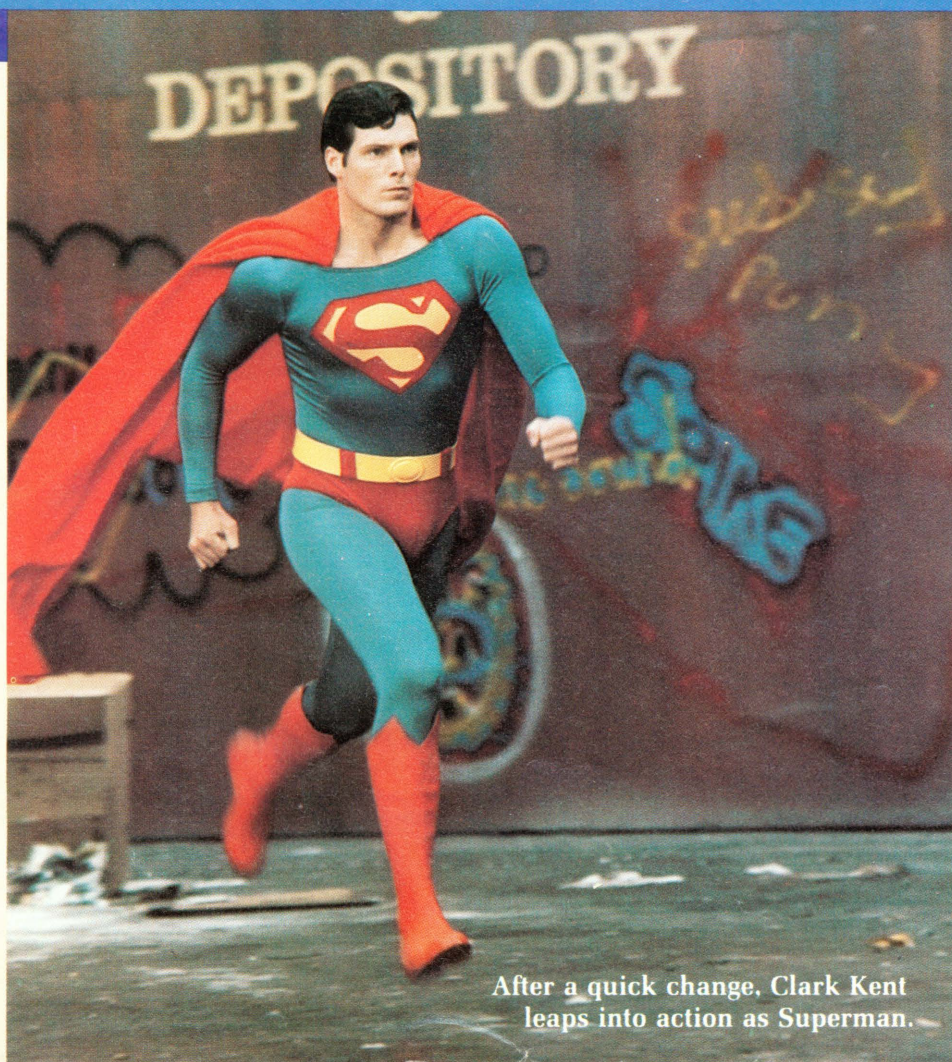
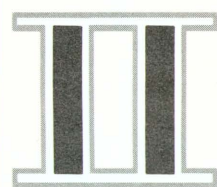
**Right:** Superman and Lois Lane arrive at the "fortress of solitude." This is Superman's home near the North Pole.







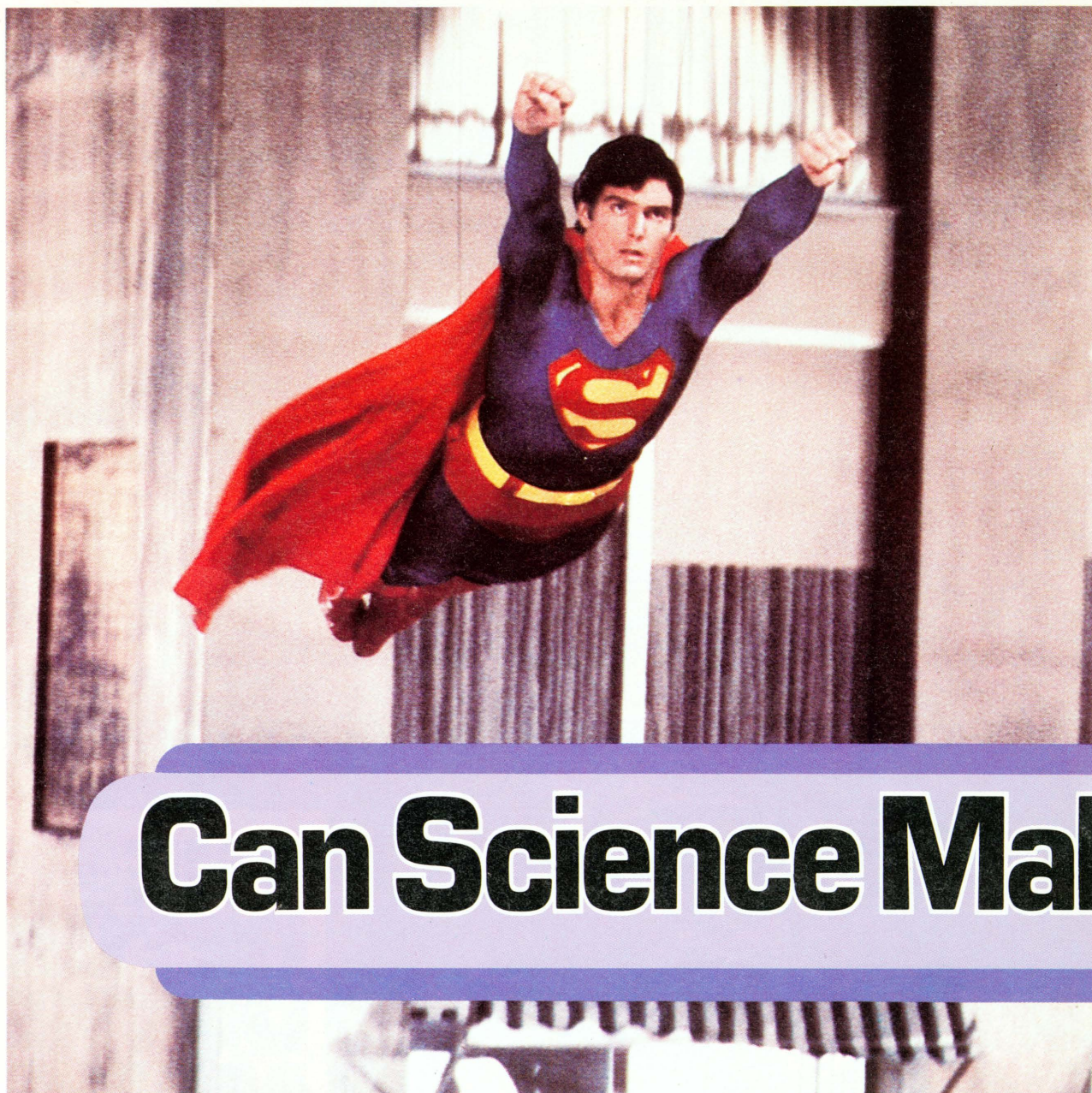
As the people of Metropolis watch, Superman matches strength with General Zod.



After a quick change, Clark Kent leaps into action as Superman.

# THE RETURN OF THE MAN OF STEEL





# Can Science Make

by Douglas Colligan

Many people know the legend by heart. He was born on a planet named Krypton. It gleamed in the light of a red sun. Just before the planet was destroyed, his father sent him off on a rocket trip through space. In time, the child's rocket landed on another planet. It had a yellow sun and much weaker gravity than Krypton.

Together, these differences worked amazing changes in his body. He grew very strong. He could see through steel and send out powerful beams of heat from his eyes. Nothing, except kryptonite, seemed to hurt him. He could even fly!

**Above:** Superman uses his super powers to fly through the air. With a little help, ordinary people can zoom through the sky, too.

He, of course, is Superman. And the planet with the yellow sun is earth.

## Could It Really Happen?

Did you ever wonder if there's a little bit of truth to this story? Can real people ever develop super powers?

Here is what scientists think about the facts of the Superman story. They agree that a red sun could actually exist. Our sun is just a yellow star—one of many yellow stars. There are also big red stars called red giants. But can the light from



any sun ever cause powerful changes inside you? No. Scientists say that all you would get is a tan or a sunburn—on the outside of your body!

Another true idea from the Superman story is that gravity is different in some places. On the moon, for example, weaker gravity would let you do some super weight lifting tricks. Remember the astronauts who lived in the space laboratory Skylab? Gravity affected them less because they were farther away from earth. They could balance other astronauts upside down on the tip of one finger. But what looked like super strength didn't last when they returned home.

So, even though some facts in the Superman story are true, none of them could help you to develop super powers. The only place you are going to meet Superman is at the movies.

But it is possible for people to perform certain super feats—with a little help, that is. Scientists

have built some amazing gadgets. Some of these inventions could add to your strength. Others can make it possible for people to fly without a plane—all the things you thought only Superman could do.

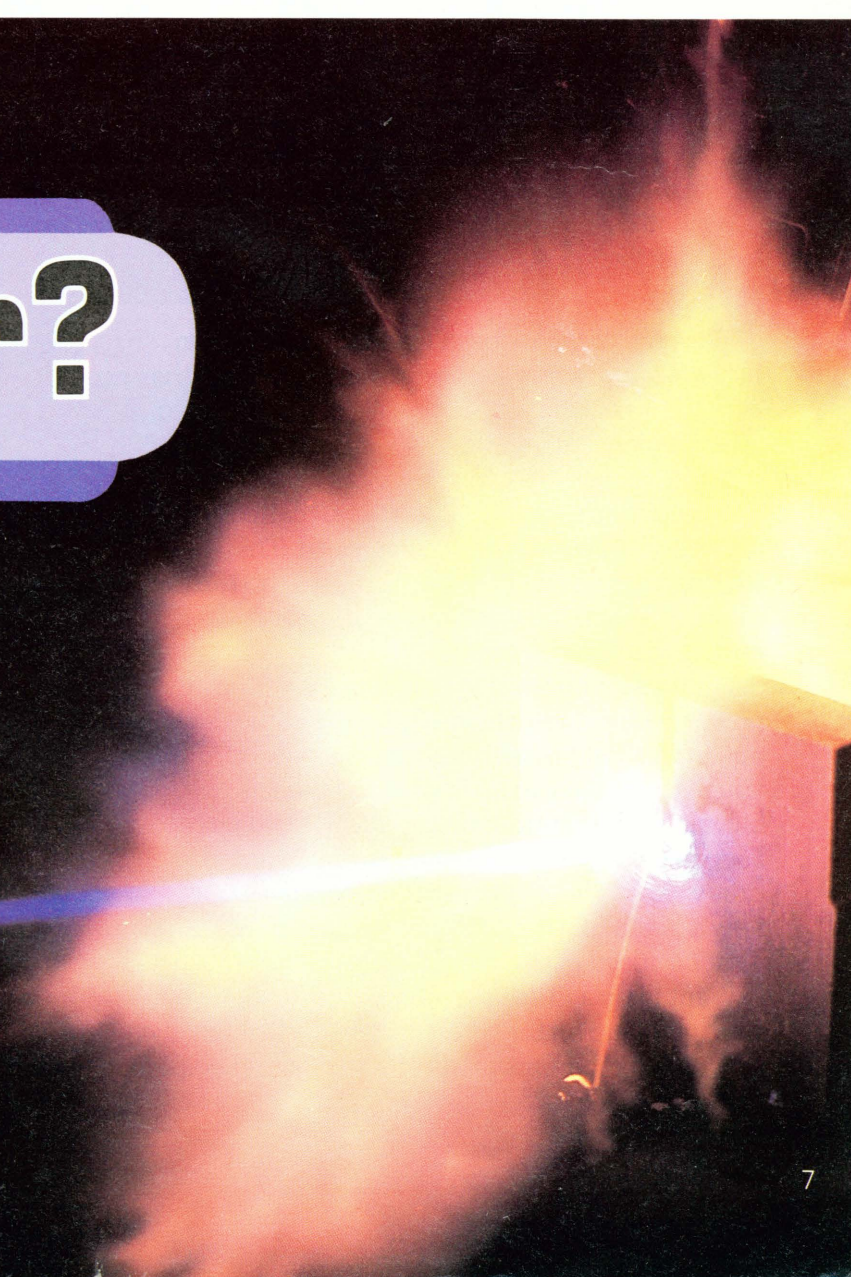
## Heat Vision

Using his special heat vision, Superman can melt steel with a glance. Now people can do almost the same thing with a special beam of light called a *laser*. Lasers are machines that concentrate pure light into a very fine ray that travels in one line. These light beams can carry much more energy than ordinary light which spreads out in all directions.

Laser beams can burn through many things. In factories, they are used to cut out patterns for clothes. When doctors operate on people, sometimes they use a laser instead of a scalpel. ➡

# You Super?

You can't melt steel with heat vision like Superman. But you could do it with a special light beam called a laser. Here, a laser is used to cut through a bar of aluminum metal.





Lasers can even burn holes through diamonds—the hardest substance found on earth.

## Super Strength

Superman often crashes through walls. He is able to do that because he's stronger than a locomotive. In real life, people can increase their strength, too. All they need is a special set of muscles called an *exoskeleton*. Since "exo" means outside, this is a metal suit that goes on outside your real skeleton.

But don't plan to slip into an exoskeleton and go slug the bully next door. So far, these steel or aluminum suits are made only for very special purposes. One model is for astronauts who might have to walk on planets where gravity is more powerful than earth's. If an astronaut landed on Jupiter, she would weigh two and a half times what she weighs here on earth. Walking only five feet would wear her out for the day.

That's where exoskeletons could help. They instantly copy all motions of the wearer. They also have special motors to make a person's leg push twice as hard as usual. And with their help, your arm could lift two times as much as usual with no extra effort.

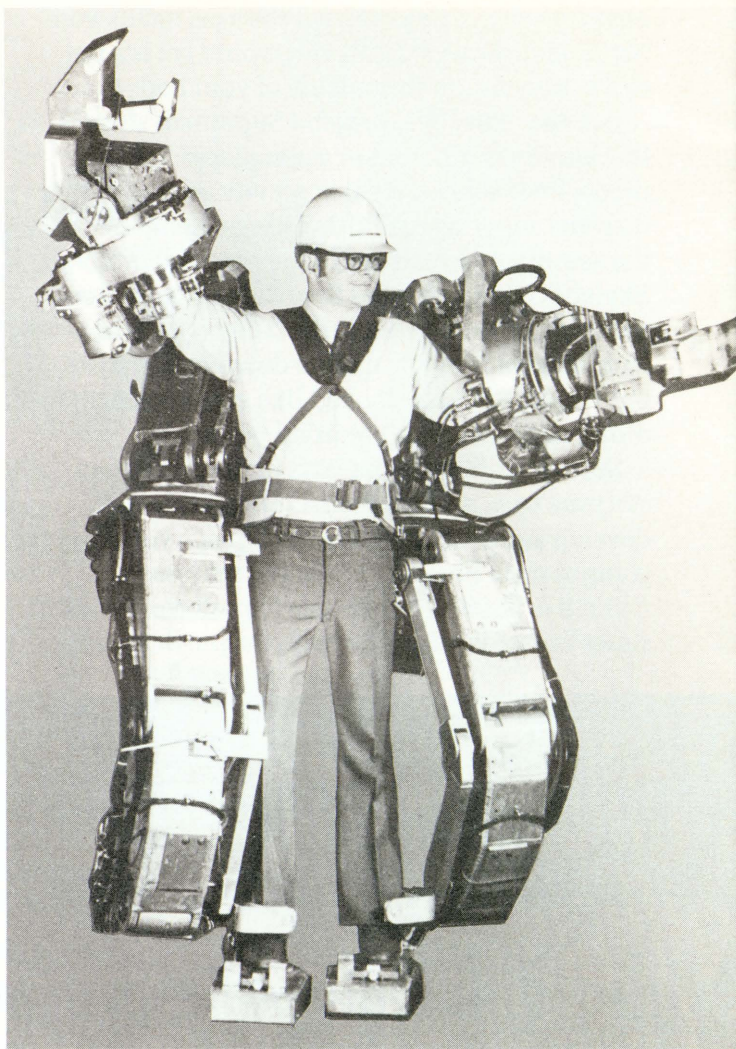
## Flying

The Man of Steel doesn't wait for a bus when he wants to go somewhere. He just zooms into the air. Of course, you can fly too. All you have to do is buy a plane ticket. But that's not quite as good.

There is one way that people can fly without any help from a motor. Light aircraft called hang gliders are powered only by the wind. They look like big kites. To fly them, people go up to the top of a cliff. When the wind blows, they take off and fly, hanging on tightly.

For those who want to fly using their own power, a new one-person airplane is being developed. This light plastic craft gets its power from you. All you have to do is sit in the plane's bicycle seat and pump its pedals. But you have to keep pedaling or you'll crash. And this plane is pretty slow. Three years ago, a very strong pilot flew a plane like this 25 miles in three hours. That's a speed of about eight miles an hour.

Want to fly a little faster than that? Well, if you were going up on the Space Shuttle, you might get your chance. One piece of equipment that's made for space travelers is the rocket backpack. It



has small jet rockets that people can control with their fingertips. These rockets let you fly forward, backward, up, down or even sideways.

Rocket packs are made so that astronauts can go outside the shuttle to repair it if they need to. Each pack carries its light and fuel supply for six hours of flying. It even has electrical sockets so that people can plug in their power tools. Hey, that's pretty good. Even Superman can't plug in a staple gun to fix his cape if it rips while he's flying.

## Science and Super Gadgets

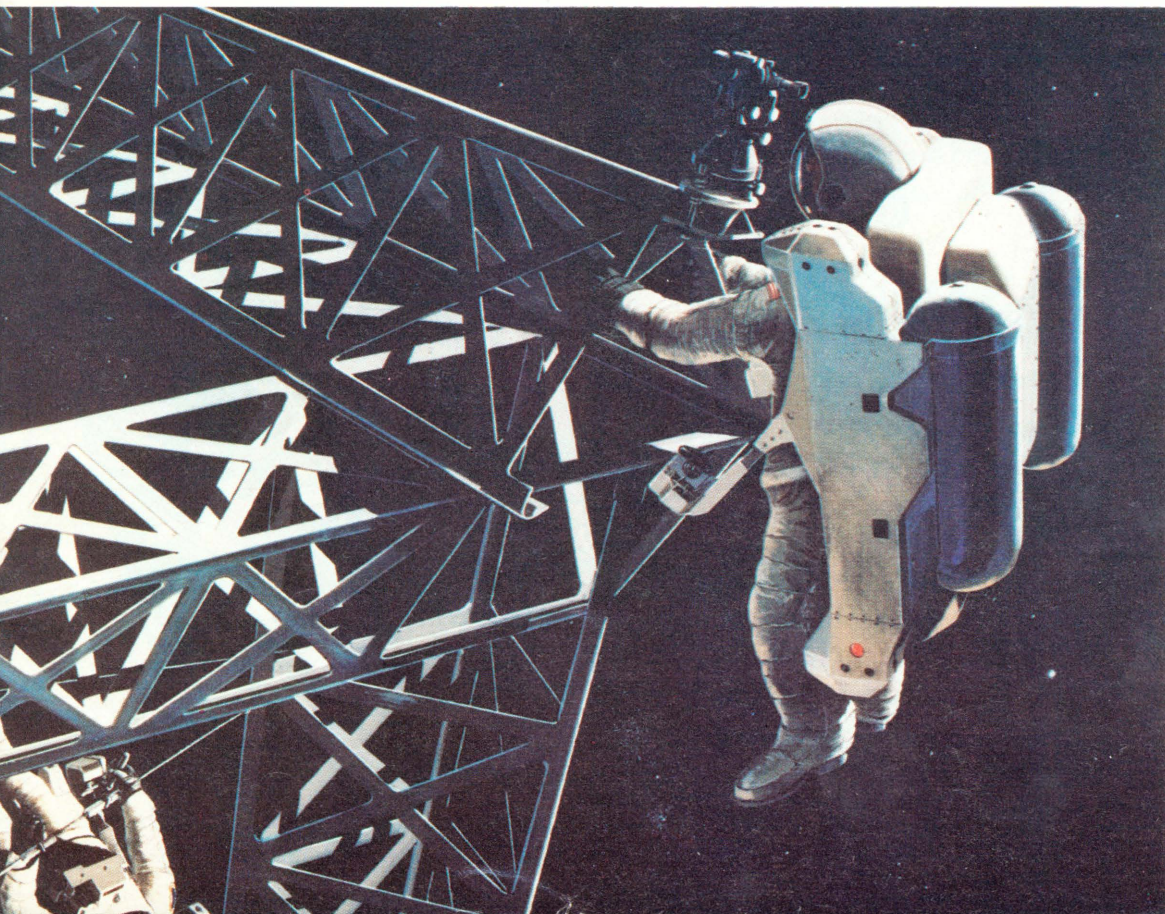
Of course, people can't fly with rocket packs very often—at least not yet. You won't be able to buy an exoskeleton soon either. And these gadgets don't give people real superpowers, because they don't make them permanently different. What these tools do is add to the natural powers that your body already has. That's how science—at least sometimes—can make you super.



**Left:** Machines called exoskeletons can give an ordinary person super strength. Strapped inside the one you see here, this man can now lift up to 1,500 pounds.

**Right:** Hang gliding is one way that people can fly. Just hang onto this giant kite and soar through the air using nothing but the wind.

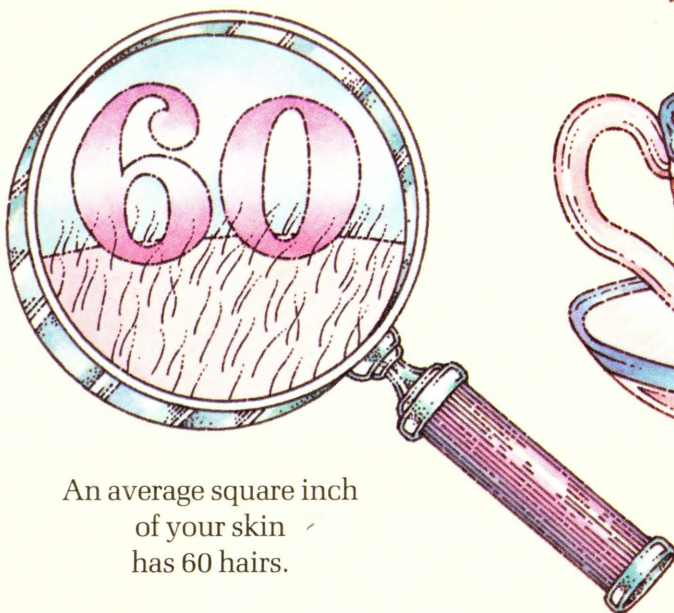
**Bottom:** Astronauts may soon be flying in outer space. NASA is working on jet backpacks that will allow them to leave their ships and move around in space.





# Factoids

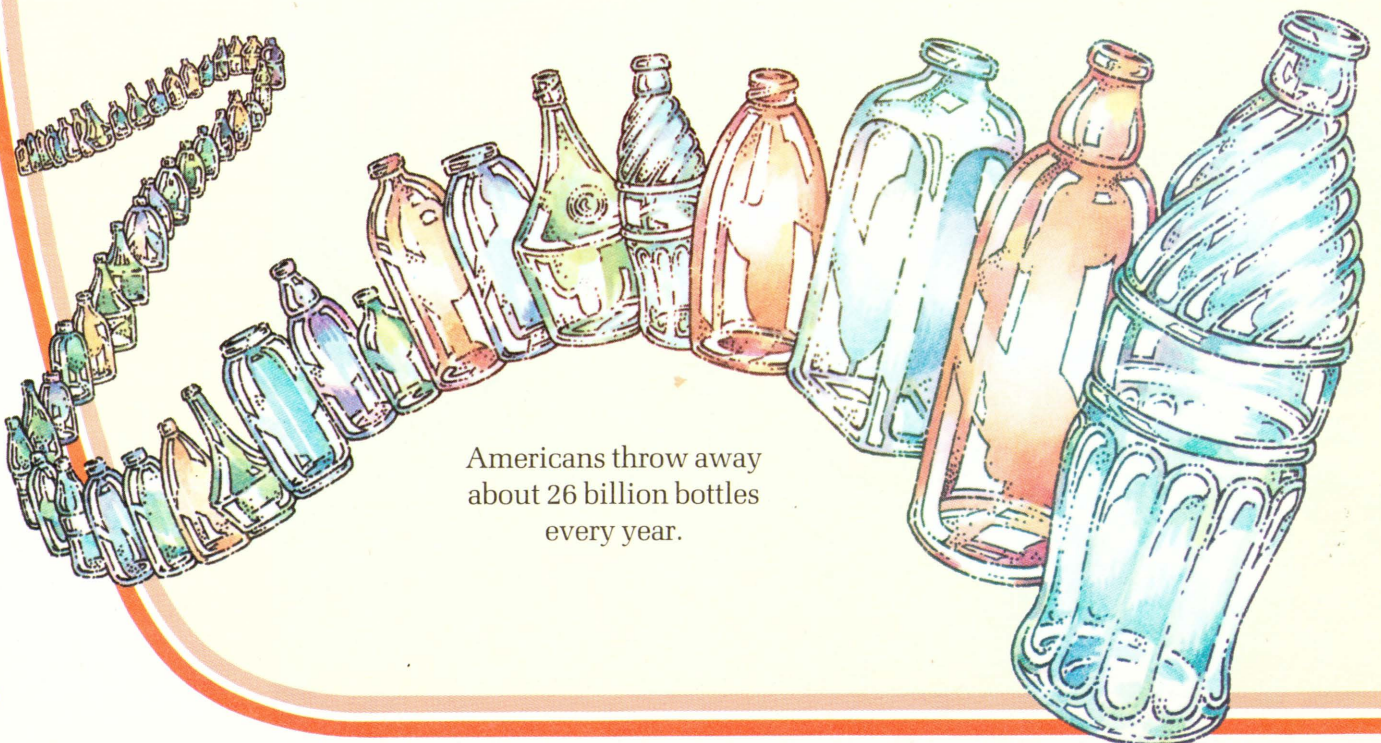
What are factoids? They are weird little facts that are stranger than strange, truer than true. Use them to wow your friends, amaze your family and dazzle your teachers.



An average square inch of your skin has 60 hairs.

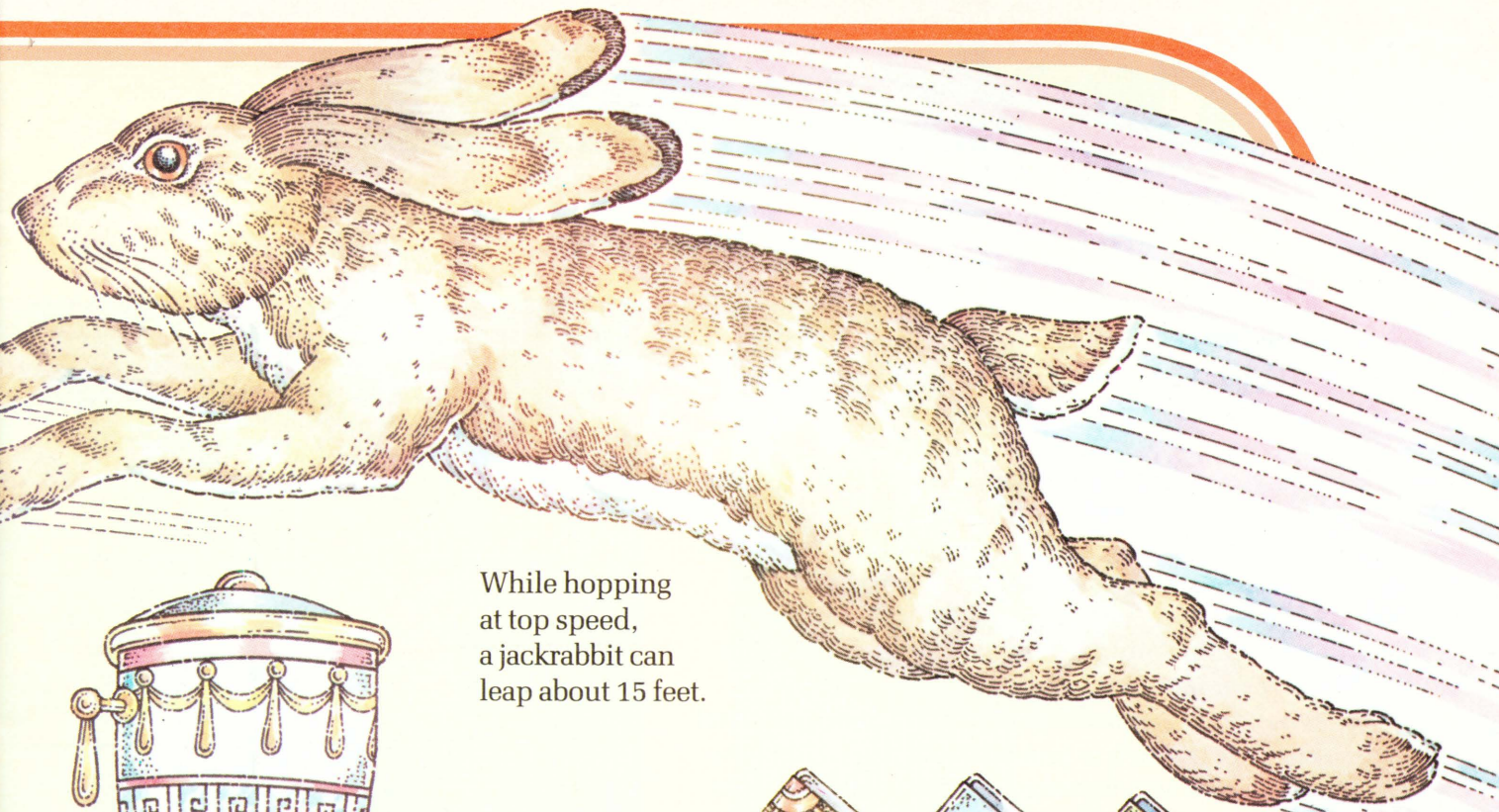


The smallest tree in the world is Greenland's dwarf willow. It is two inches high!

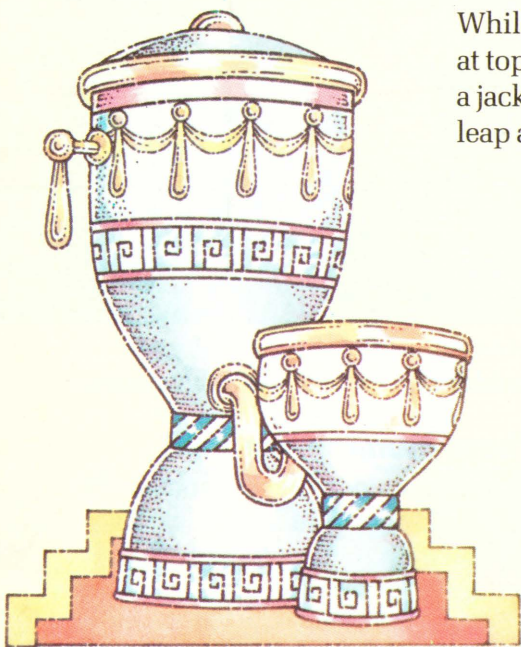


Americans throw away about 26 billion bottles every year.

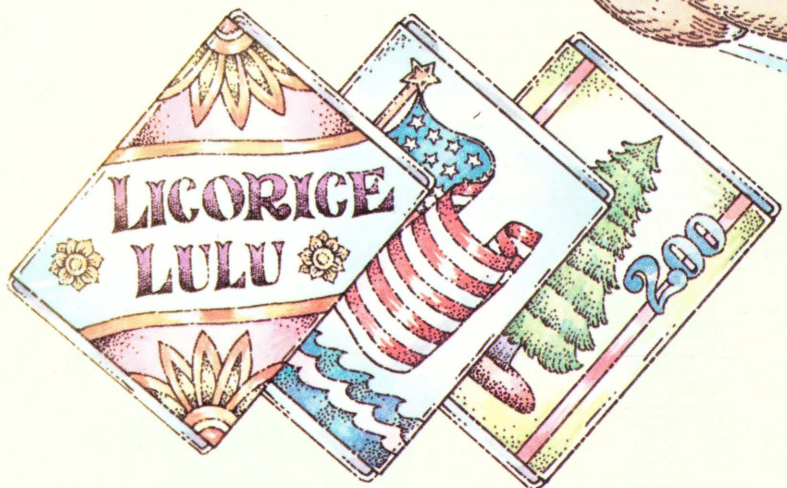




While hopping  
at top speed,  
a jackrabbit can  
leap about 15 feet.

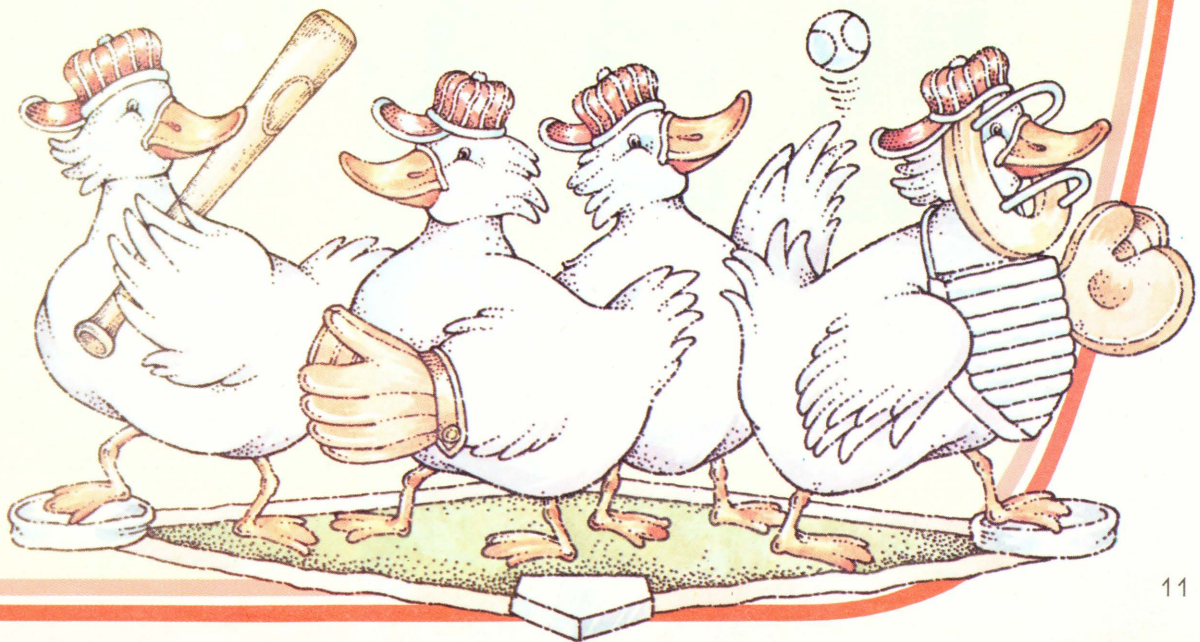


The flush toilet was invented  
4,000 years ago by people  
on the island of Crete.



Early chewing gum brands had names like  
“American Flag,” “Licorice Lulu” and “200 Lump Spruce.”

A group  
of ducks  
is sometimes  
known as  
a team.





# Contact Report

by Chris Dufour

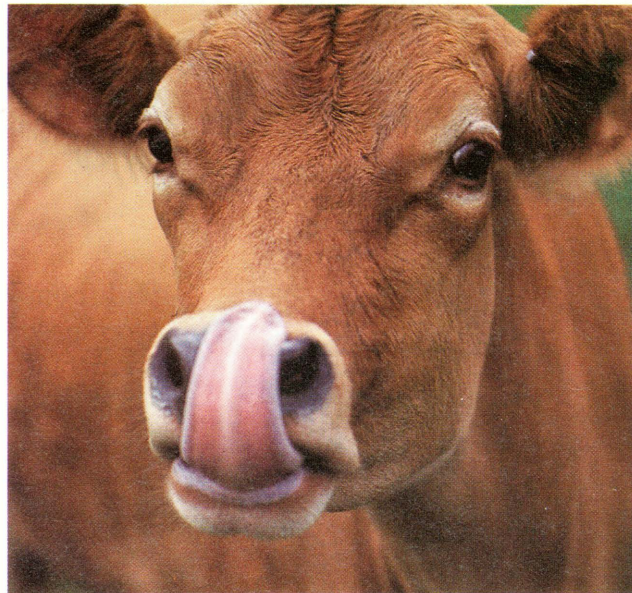
## Say Cheeeese!

An apple a day keeps the doctor away. But if what you want to avoid is the dentist's drill, maybe you should eat cheddar cheese.

Scientists are finding that cheddar may actually help to prevent tooth decay. But they are not yet sure how it works.

All that scientists know so far is that the cheese seems to do the job—at least on rats. In one study, laboratory rats were first given sugary food. Then some of these rats got cheese to eat while the others didn't. The ones which ate the cheese developed fewer cavities.

Scientists are excited because they may have discovered the first food ever known to prevent tooth decay. But now they must do more tests to make sure that cheddar cheese works as well for people as it does for rats.



Holy cow!

Cheddar cheese may prevent cavities.

## Whose Mummy Are You?

If you wanted to find out something, you would never think to check with an Egyptian mummy. But today some scientists are studying mummies to learn new facts. In one case, they even found a mummy's mommy.

One of the new tools used to study mummies is X-rays. Scientists wanted to identify a mummy known only as Elder Lady. So they took X-rays of her. Then they compared them to other X-rays taken of a mummy called Queen Thuya.

Since the bones of the two mummies looked alike, researchers decided they might belong to the same family. They also matched up hair samples. The scientists decided that Elder Lady now can be identified as Queen Thuya's daughter Queen Tiye.

X-rays of other mummies show that many ancient Egyptians weren't very healthy. Some of them had polio, lung diseases, bad teeth and (yuk!) worms.



**Left:** Scientists are using X-rays to study mummies.



# Contact Report

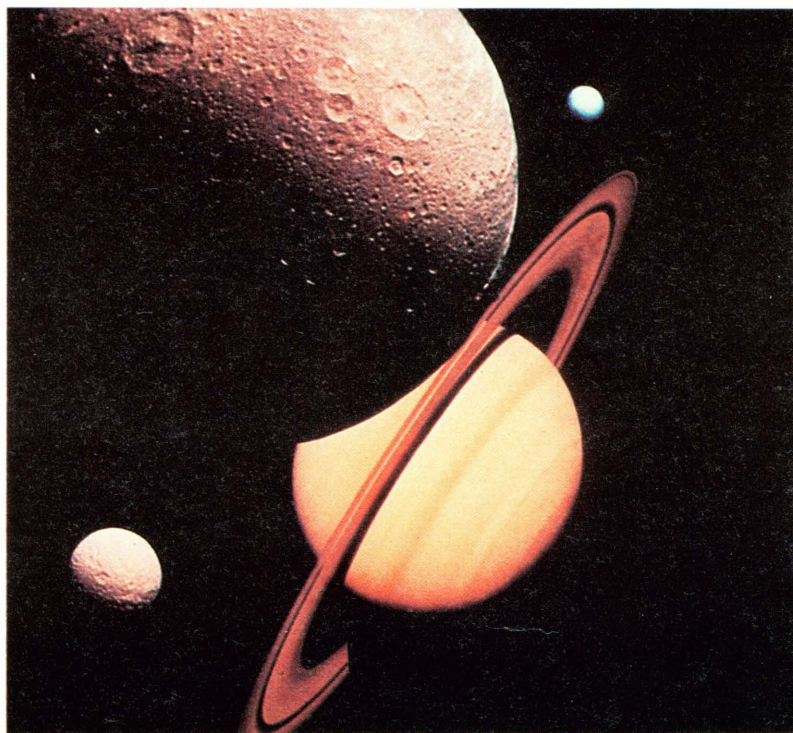
## Ring Around the Planet

NASA scientists were really excited last fall. The explorer spacecraft Voyager 1 flew by Saturn and sent back lots of new information about the ringed planet.

Now, NASA is eager to take another look. Their chance will come on August 25. That's when Voyager 2, the latest space explorer, will fly close to Saturn and take more pictures.

Scientists want to find out more about one special ring around the planet. It seems to be made up of many strands of matter. The strands are coiled together like a hair braid. And what's more, tiny particles shoot out from this unusual ring. No one yet knows why this happens.

NASA also wants to know just how many rings there are in all around Saturn. Only three can be seen from Earth. But Voyager 1 found over 500. And who knows how many there will be after Voyager 2 finishes counting?



Soon Voyager 2 will reach Saturn.

## Littlest Livestock

You've seen a farm with a herd of cows. But did you know there are farms with herds of butterflies? That's right. Farmers on the island of New Guinea are actually raising millions of butterflies each year.

Why are these farmers raising butterflies instead of food? They need a crop to sell that will bring in cash. And beautiful butterflies are worth a lot of money. Some people collect them like stamps. Others use their lovely wings to decorate trays and jewelry. Museums display butterflies and scientists buy them to study.

New Guinea farmers raise other unusual animals—like crocodiles and buffalo. But butterflies are in greater demand—and much easier to feed.

**What's That?** Have you seen a story in a newspaper or magazine that belongs in the *Contact Report*? Why not cut it out and send it to us? Be sure to include your name, age, address and the place you found the story. Send it to:

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Butterflies are being raised on farms.

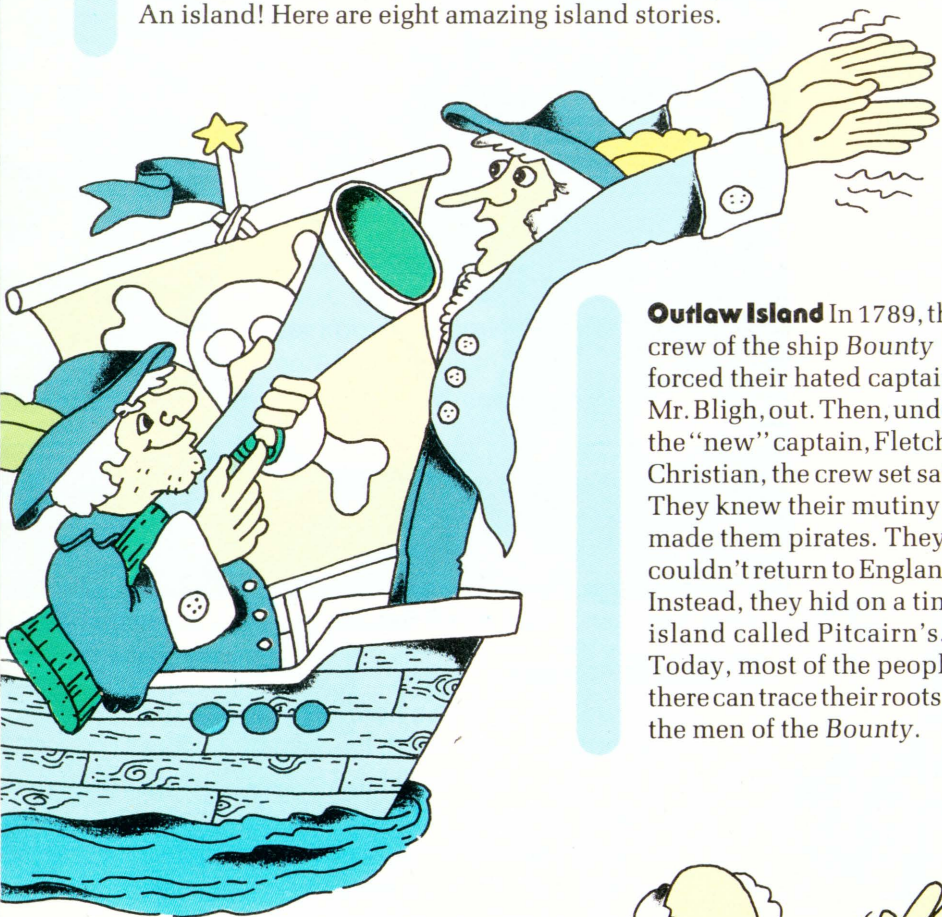


# List of the Month

## Incredible Islands

by Christine Economos

What's surrounded by water and loaded with mysteries?  
An island! Here are eight amazing island stories.

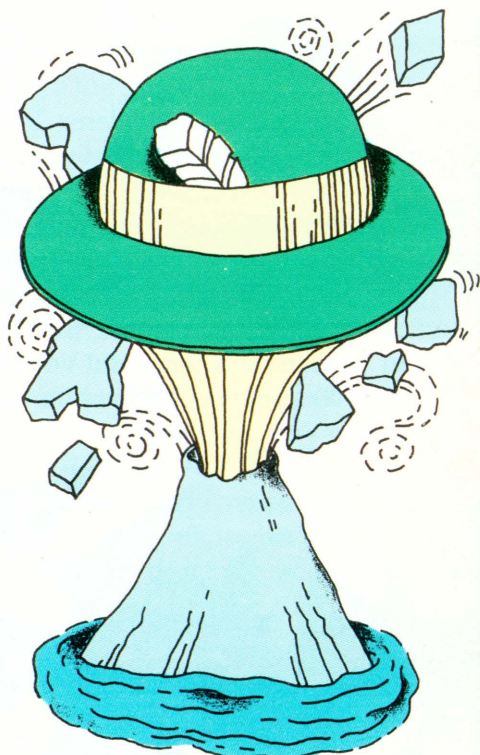


**Outlaw Island** In 1789, the crew of the ship *Bounty* forced their hated captain, Mr. Bligh, out. Then, under the "new" captain, Fletcher Christian, the crew set sail. They knew their mutiny made them pirates. They couldn't return to England. Instead, they hid on a tiny island called Pitcairn's. Today, most of the people there can trace their roots to the men of the *Bounty*.

**Jail Island** Where is the meanest, toughest place to send prisoners? The French government sent theirs to a tiny island near South America. Its name was Devil's Island . . . with good reason. The climate was hot and sticky. The strong water currents around the island made escape nearly impossible. In 99 years as a prison island, 70,000 people were kept there. Only 27 ever managed to escape!

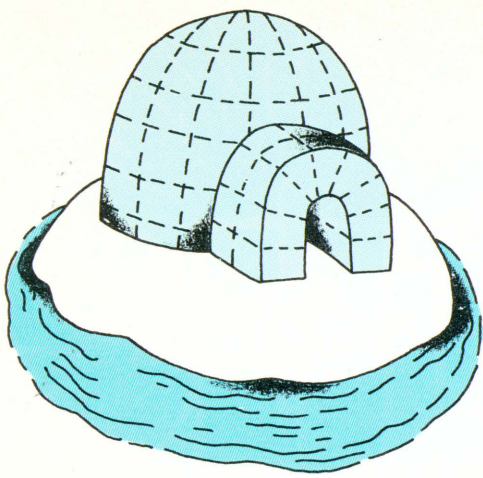


**Ice Island** Islands can also be found in fresh water lakes and rivers. Schodack Island sits in the northern part of the Hudson River. Years ago there was an ice house on the island. In the winter, workers cut huge blocks of ice from the frozen Hudson. Teams of horses dragged the ice blocks to Schodack where they were stored. Later, the ice blocks were shipped all the way to South America!



**Super Island** What's the world's biggest island? Here's a hint: it's bigger than Alaska and just as cold. The answer is Greenland, an island in the Arctic Ocean. Greenland's name doesn't make much sense. Most of the island is covered by a thick glacier. The people there live on the island's coast where it is warmer. Like people on many islands, they make their living catching fish.





**For the Birds?** The Canary Islands were named by the Roman explorers who discovered them 2,000 years ago. When they landed, they found the island overrun with packs of large wild dogs. The Roman word for dogs was “canis.” So they called the island Canaria. Little did the Romans know that, years later, pretty yellow songbirds from those islands would be called—what else?—canaries!



**Now You See It...** Can an island disappear? It may sound impossible, but it has happened. In 1883, the huge volcano on the Indian Ocean island Krakatoa blew sky-high. Into the air went rock and ash. The sky was dark for days. When the worst was over, sailors explored the damage. They were amazed to find that the tiny island of Polish Hat had been blown to bits and was nowhere to be seen!



**Treasure Island** The “Isla del Coco” is an island near Costa Rica. It is said that hidden in its caves is a fabulous treasure. In 1823, on his way to Spain, the captain of a treasure ship turned pirate. He buried his loot on Coco, and swore he would return. He never made it, and the treasure remains.. People still search for the \$20 million worth of treasure believed to be hidden there.



**An Island Is Born** In November, 1963, there was a huge underwater eruption near Iceland. It caused land from the bottom of the sea to be pushed above sea level. And that’s how Surtsey, one of the world’s newest islands, came into being. Scientists from all over the world came to see Surtsey. For the first time they could study how plant and animal life begins on a new island.







by Mary Ann Castronovo

KISS used them on stage during concerts. President Reagan watched them at his inauguration. They even appear in a new movie with John Travolta. Chances are, you'll see a few of them yourself on the Fourth of July. What are they? Fireworks, of course!

The ones that were shot off for KISS, the President and in the movie *Blowout* were all designed and made by one family—the Grucci family of Bellport, New York.

Why are the Gruccis so good at making fireworks? One reason is that they love what they do. "If you like your work, you'll be a success," says Felix Grucci, the 75-year-old head of the family.

The Gruccis also like working together. At their fireworks factory, Felix works with his wife Concetta, and their grown-up sons and daughter. Even the eight Grucci grandchildren help sometimes. They are all carrying on a family custom that began with Mr. Grucci's grandfather. He first started making fireworks about 125 years ago. Mr. Grucci himself has been in the fireworks business over 50 years.

Fireworks are made nearly the same way today



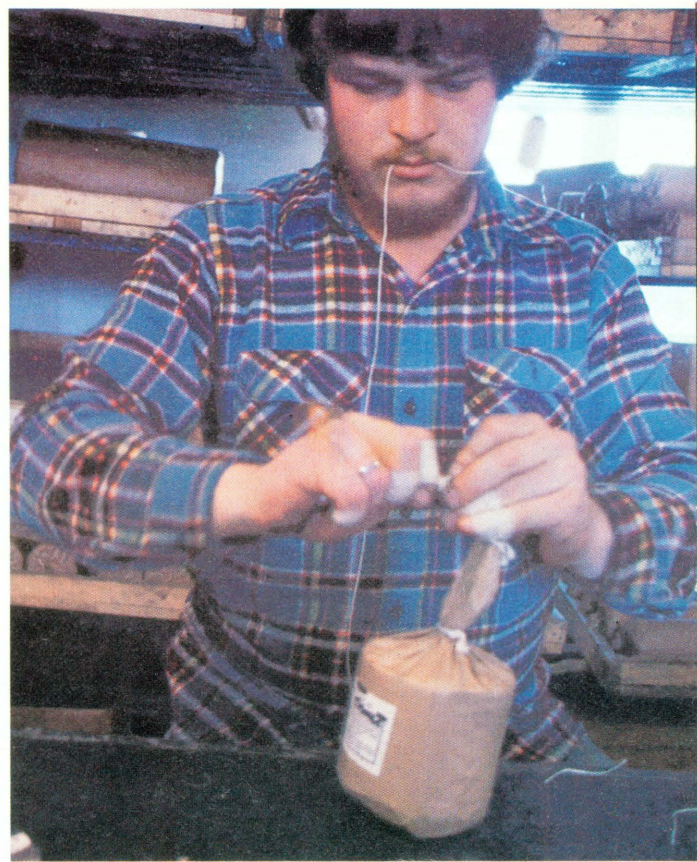
**Above:** Fireworks light up people's lives. Here is the Grucci family which has been making fireworks for over 100 years.

as when Felix's grandfather made them. They are still put together by hand. Here's how the Gruccis make fireworks.

### **Pow, Pow, Power**

First, they take certain chemicals and stir them with water and alcohol until they form a mixture





**Above:** Felix Grucci and a worker in his factory show how fireworks are made. Fireworks have always been made by hand.

**Left:** Last January, the Gruccis' fireworks made a hit in Washington, when President Reagan took office.



that looks like bread dough. Different colors are made by adding different chemicals.

The "dough" is packed until it's hard as a rock. Then it is sliced and sprinkled with gunpowder.

The slices are cut into cubes. Some cubes are made larger than others. The bigger the cubes, the longer they burn. More gunpowder is sprinkled on the cubes and they're left to get completely dry.

"If they get damp or wet, a chemical reaction could make them go off," warns Mr. Grucci. In the summer, the cubes are dried outdoors. In rainy or cold weather, they are put in a special drying room.

For the next step, gunpowder is poured through a funnel into the center of a paper shell that is shaped like a can. Dry chemical cubes are packed around the paper shell. The shell is folded and glued shut.

Finally, a small amount of gunpowder is added to the bottom of the shell. A fuse is added to the top. The shell is ready. To make a big fireworks show, the Gruccis make *thousands* of shells. ➡



## Show Time!

When the Gruccis shoot fireworks into the air, they do it with electricity. First, shells are put into iron-steel mortars which look like small cannons. Then, fuses from the shells are connected to an electrical control board. This board can set off about 1,000 shells. Every fireworks show has its own head lighting specialist, whose job is to release the shells.

When the specialist pushes a button on the control board, an electric spark is sent to the shell. Gunpowder in the bottom of the shell shoots it into the air. Meanwhile, the fuse has been lit. When the shell is high in the sky, the burning fuse reaches the gunpowder in the middle of the shell. BOOM! The shell bursts. The burning cubes then create the colorful patterns you see.

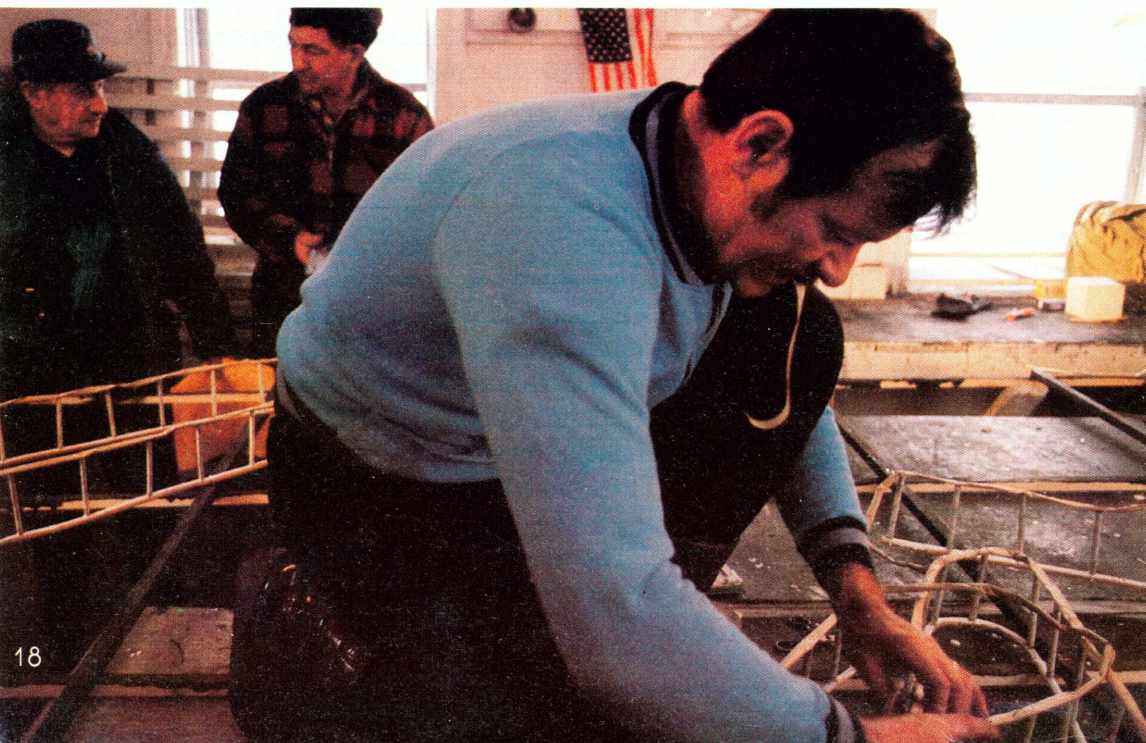
The Grucci grandchildren often help out at shows. They carry fireworks and boxes and do some of the less dangerous work. They are not allowed to get involved in any jobs where they might get hurt. But one thing they can do as much as they want is to enjoy the fireworks.

When Jeffrey Butler tells his friends that his family makes fireworks, they sometimes don't believe him. But when he shows them pictures, they agree he's a pretty lucky 11-year-old kid.

When Jeffrey gets older, he'd like to work in the family business with his parents, uncles and grandparents. Why? "I like fireworks; they're pretty," he says. What kind of advice would Jeffrey give to other kids who want to get into the fireworks business? "I'd tell them to go see my Grandma!"



**Above:** Every year, the Statue of Liberty gets a fiery salute on the Fourth of July. Fireworks are popular on holidays.



**Left:** Some fireworks are made up so that they form pictures. They can look like a flag or even a person.



## Safety Tips

In most states it is against the law to sell, store or set off fireworks. (The Gruccis have special permission from the government to make and sell fireworks.) But if you live in an area where fireworks are allowed, be sure to keep the following safety tips in mind:

- ★ Always have an adult present.
- ★ Never light anything in your hand. "Always place fireworks in the ground," says Mr. Grucci's daughter, Donna. "The fuse could be bad and if it lights in your hand, you could lose your fingers!"
- ★ Never throw fireworks. They might hit other people and seriously hurt them.
- ★ Hold sparklers by the tip of the wire at the bottom to keep from getting burned.

Remember: Fireworks can cause you to lose fingers, an arm or leg, your eyesight, your hearing and even your life.

Your best bet: Leave fireworks to professionals like the Gruccis, and enjoy the show from a safe distance!



**Right:** Fireworks weren't always this colorful. The first ones made by the Chinese only made noise.

**Below:** Workers stand on floors covered with rubber. This keeps static electricity from building up. The tiniest spark could set off the fireworks.





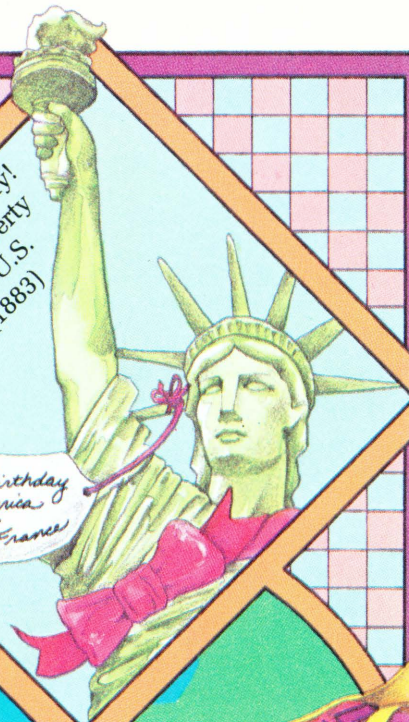
2

The first American zoo opens in Philadelphia. (1874)



4

Happy Fourth of July!  
The Statue of Liberty is given to the U.S. by France. (1883)



12

William Goodale patents the first paper bag making machine. (1899)



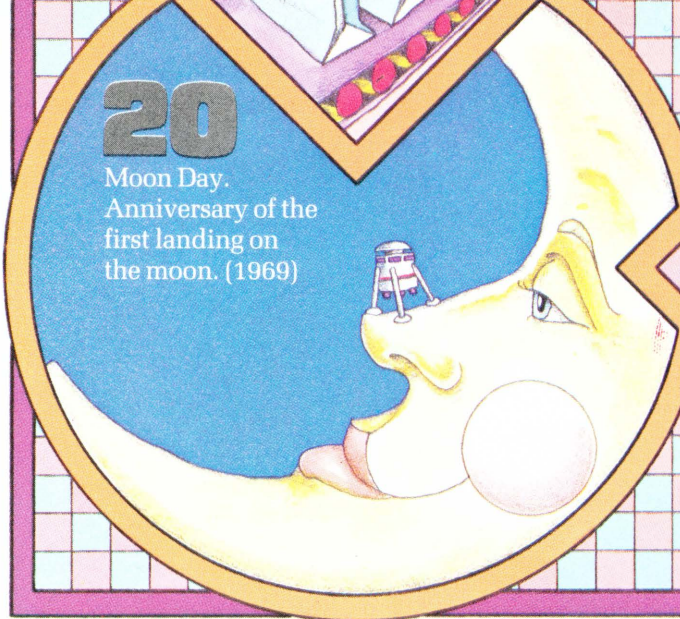
15

Wiley Post begins the first solo around-the-world flight. His trip will take nearly eight days. (1933)



20

Moon Day. Anniversary of the first landing on the moon. (1969)



28

Western Union introduces the singing telegram. (1933)



S M T W T F S

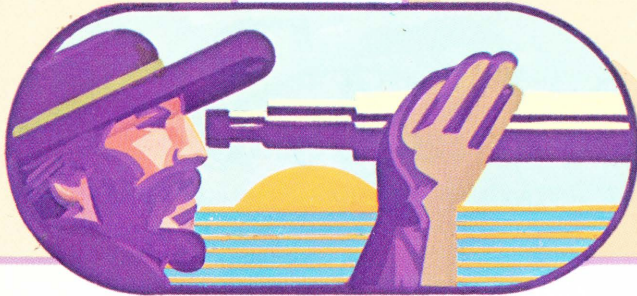
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26	27	28	29	30	31		

Earth Days

July



3



Columbus sets sail from Spain on his most famous voyage. (1492)

6



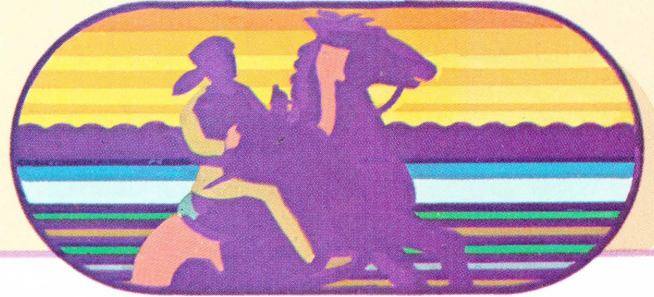
Gertrude Ederle becomes the first American woman to swim the English Channel. It took about 14 hours. (1926)

15



The Panama Canal officially opens. (1908)

17



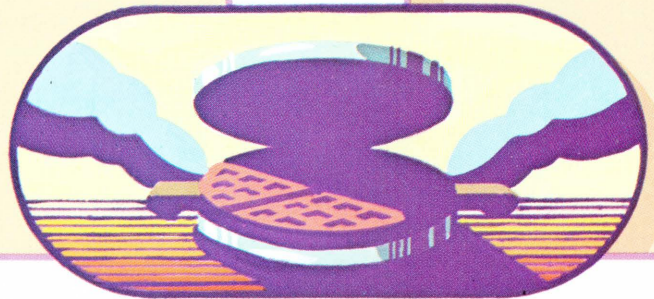
Birthday of Davy Crockett, frontiersman and explorer. (1786)

19



National Aviation Day.  
It's also the birthday of Orville Wright.

24



Cornelius Swartout invents the waffle iron. (1865)

GARNER

S M T W T F S

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2	3	4	5	6	7	8	
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Earth Days

August



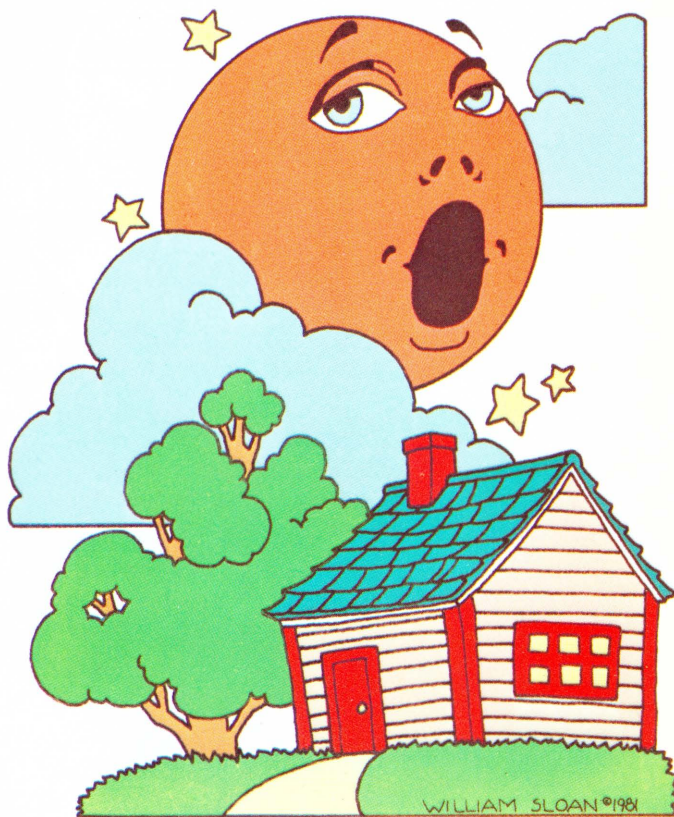
# Any Questions?

**Why does the moon sometimes change color?** Most of the time when you see the moon it looks white. But not always. Like the sun, the moon sometimes looks orange when it is rising or setting.

White light is really made up of many different colors. But you only get to see these colors under special conditions. Raindrops, for example, can scatter the many colors that make up light. When this happens, all the colors appear separately in a rainbow. You see red, orange, yellow, green, blue, indigo and violet.

White light is also scattered by the air, dirt, dust and clouds that make up the atmosphere. When this happens, red and orange light are scattered the least. You see much more of these colors than the others.

When the moon is rising or setting, its light has to travel through more of the earth's atmosphere than at any other time. So the moon's light is broken up more. The result? You see an orange moon.



## Where does dust come from?

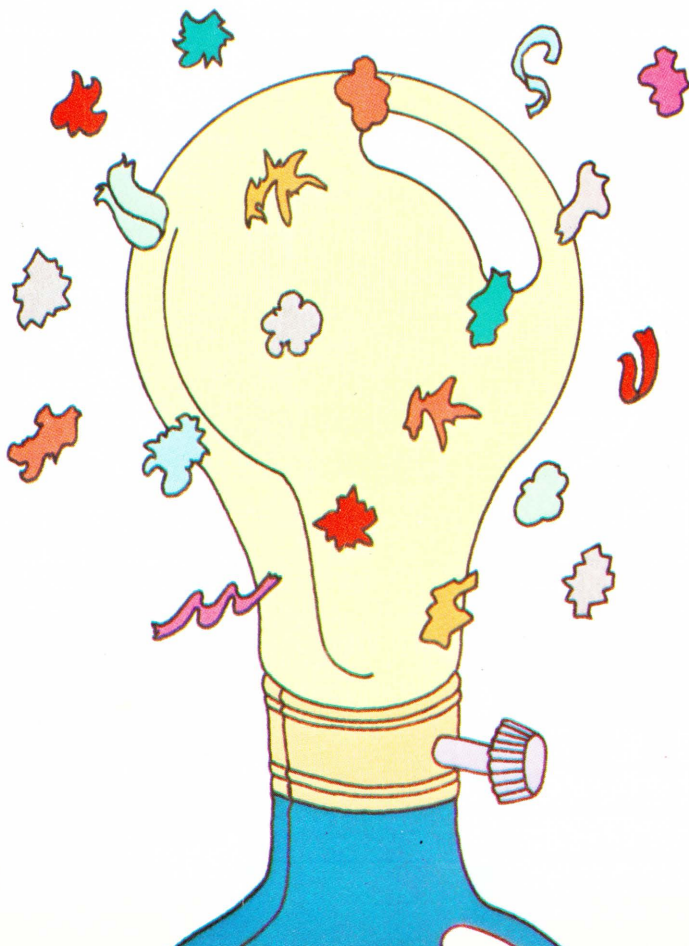
Turn on a light bulb. Hold your arm near it and brush your sleeve. You will see bits of dust jump into the air. There's lots of other dust floating around, too. Much of it is too small for your eyes to see.

If you could get a good look at dust, you might be surprised. It can contain many things. These include pieces of wood, crumbs of dry paint, small grains of sand, flower pollen and bacteria.

Part of that dust comes from the ordinary wear and tear of things you use. Every time you walk across a floor, you rub off tiny bits of wood or carpet. Whenever a car travels on a road, it stirs up a cloud of dirt. Just about everything produces dust.

Riding on the wind, dust can travel hundreds, or even thousands, of miles before it falls to the ground again. The volcanic ash that was blown into the air by Mt. Saint Helens traveled all the way around the world. Who knows? Some of it may be sitting in your living room right now.

Question sent in by Don Karadeema, Layton, UT.





Do you have a question that no one seems able to answer? Why not ask us? Send your question, along with your name, address, and age, to:

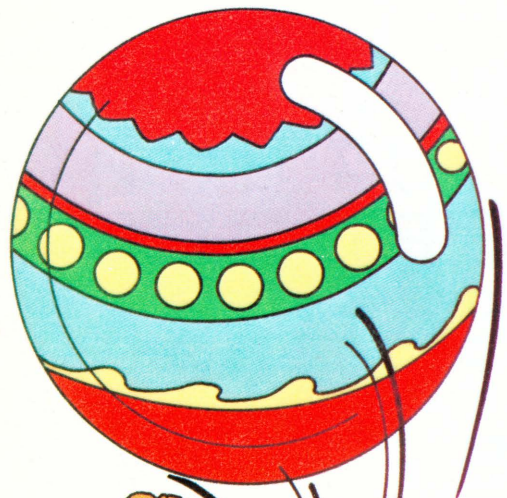
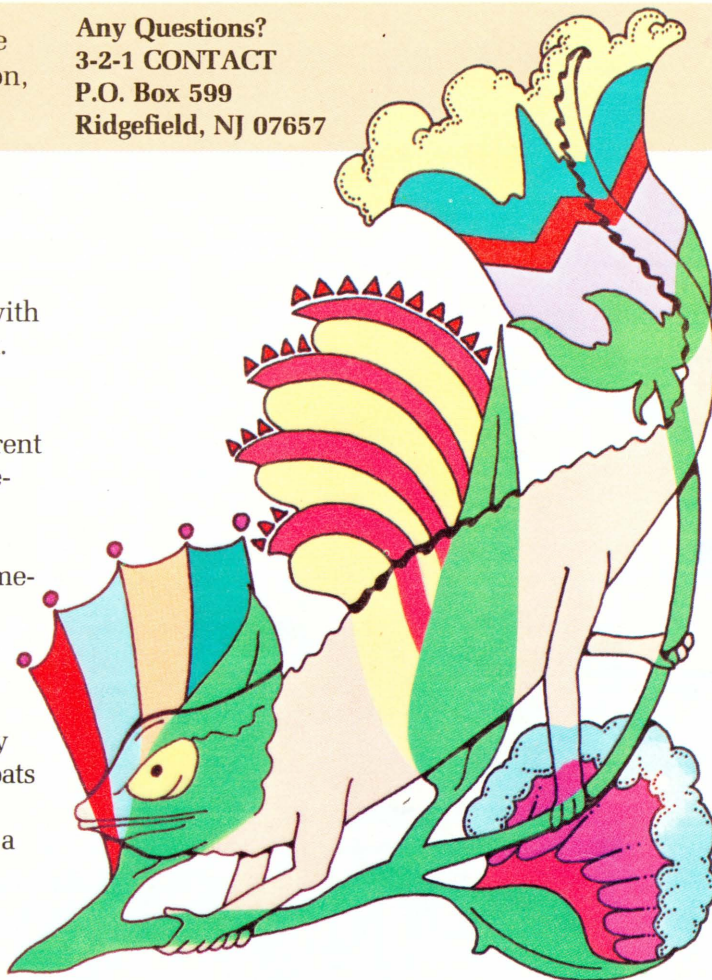
Any Questions?  
3-2-1 CONTACT  
P.O. Box 599  
Ridgefield, NJ 07657

**Why do chameleons change colors?** Don't ever try to play hide and seek with a chameleon. These little lizards have a neat trick. In a flash, they can change color to blend in with the background.

A chameleon's skin is made up of cells of different colors. By changing size, the cells hide the chameleon. Suppose a chameleon is sitting on some leaves. The green cells in its skin become bigger. Cells of all other colors become smaller. The chameleon looks as green as the leaves it is sitting on. If the chameleon moves onto a stick, the green cells shrink. At the same time, the lizard's brown cells expand. Now it looks brown.

Male chameleons also change colors when they fight. Before a battle, they get excited and their throats turn gray or black. After the fight, it's easy to spot the loser. He's the dull yellow one. The winner is a bright, bright green. Show off!

Question sent in by Lisa Morgan, Crowley, LA.



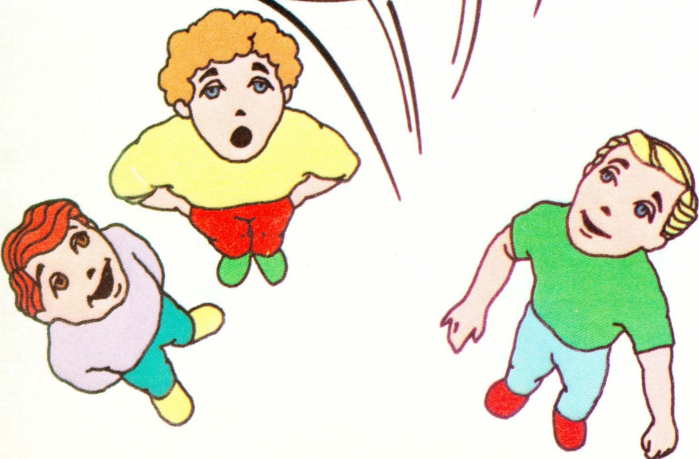
**Why does rubber bounce?** Take a rubber ball and squeeze it in your hand. When you let go, it pops back to its round shape. No matter how hard you squeeze, the ball always springs back.

When you throw a rubber ball on the floor, it gets a little squished. As it springs back to its round shape, it pushes away from the floor. In other words, it bounces.

Something that can bend and snap back is said to be *elastic* (ee-LASS-tick). Most things are a little elastic. If they weren't, they would break when you touched them. But rubber is very elastic. That's why it stretches and bounces.

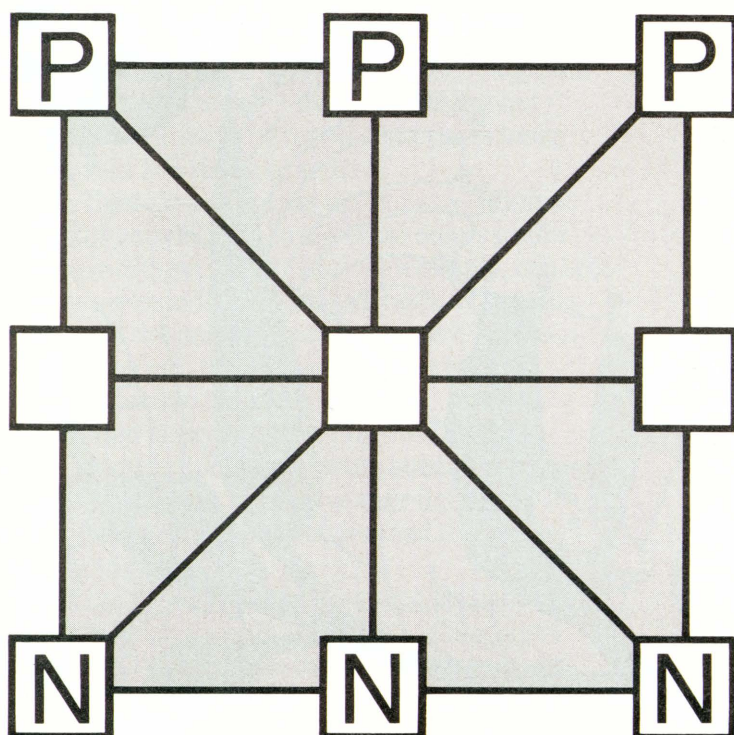
The material used for making trampolines is elastic, too. You jump on it and it s-t-r-e-t-c-h-e-s out when the force of your body hits it. When the material has gone as far as it can, it snaps back. The change sends you flying through the air.

Question sent in by Jay Barillaro, Sun City, CA.





# Dolt!



## Line Up

Two people play this new kind of tic-tac-toe. One player uses three pennies. The other uses three nickels.

### To Play

1. Place the pennies on the squares marked "P" and the nickels on the squares marked "N."
2. Take turns moving. On each turn, you must move one of your coins to any of the squares next to it.
3. You cannot jump over a coin or put two coins on the same space.
4. The first player to get her coins in a straight line wins. (It's not as easy as you think. Just because you get one in the middle square doesn't mean it will stay there.)

## Super Word Hunt

There are 12 super things in this word hunt. Find the ones that are listed below in capital letters. They are hidden across, up and down and diagonally. Some of them are backward.



CAPE  
CLARK Kent  
Daily PLANET  
FLY  
HEAT VISION  
Jimmy OLSEN  
KRYPTON  
Lex LUTHOR  
LOIS LANE  
MAN OF STEEL  
Super POWERS  
SUPERMAN

H	S	Q	L	U	T	H	O	R	C
K	E	R	E	R	N	E	L	B	W
R	K	A	E	K	E	P	S	E	S
Y	R	Y	T	W	D	A	E	N	U
P	A	O	S	V	O	C	N	A	P
T	L	L	F	F	I	P	L	L	E
O	C	A	O	F	A	S	P	S	R
N	H	T	N	R	L	N	I	I	M
X	T	U	A	E	Y	Y	E	O	A
T	U	L	M	Z	T	V	U	L	N

Answers on page 37.



# What Do You Know About Water?



## A CONTACT QUIZ By Jonathan Schwartz

Summer is here. That probably makes you think of hot, sticky weather. But you should also think about water. After all, that wet stuff is an important part of summer. Chances are, you will spend at least part of your vacation splashing around in a lake, ocean or swimming pool. You probably know all about water. Or do you? On this page are eight questions about water. Try to answer each one. But be careful. Some of them are pretty tricky!

1. It is easier to float in fresh water than in salt water.

**True or False?**

2. Pollution can make rain water harmful.

**True or False?**

3. Chlorine in swimming pools helps keep you healthy.

**True or False?**

4. Most people use a gallon of water to brush their teeth.

**True or False?**

5. Sometimes water can go up trees.

**True or False?**

6. Camels can go without drinking water longer than any other animal.

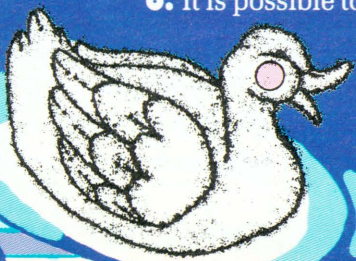
**True or False?**

7. Your sweat makes you cooler.

**True or False?**

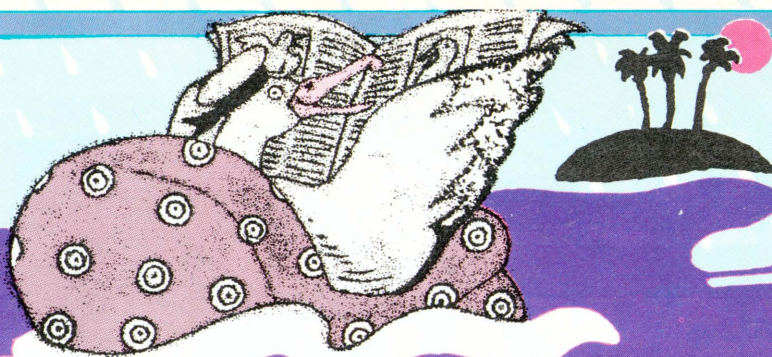
8. It is possible to get natural soda water from underneath the ground.

**True or False?**



Answers on the next page.





**1 False** In fact, it's easier to float in salt water. Try this experiment. Drop a hard boiled egg in a jar of plain water. It sinks. Now add a lot of salt. The egg floats to the top of the jar!

When things are put in water, their weight pushes them down.

At the same time, the water is pushing up. If the water pushes with equal force, things float. When water has salt in it, it is more tightly packed, more dense, than fresh water. It is better able to hold things up. That makes floating easier.

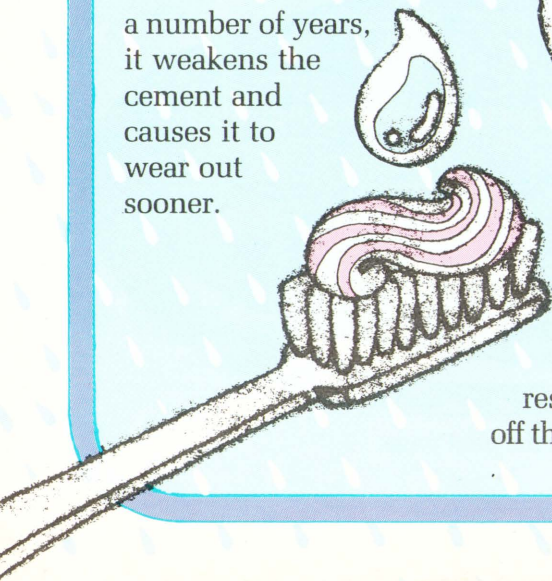


**2 True** Walking in the rain isn't what it used to be. Pollution fills the air with an invisible gas called sulfur dioxide. This gas combines with water in the air to form acid rain. In some parts of the country, this rain is collecting in lakes. There, it kills the baby fish and the plants they eat. Soon there won't be any more fish in these lakes. Acid rain can also damage buildings and sidewalks. Over a number of years, it weakens the cement and causes it to wear out sooner.

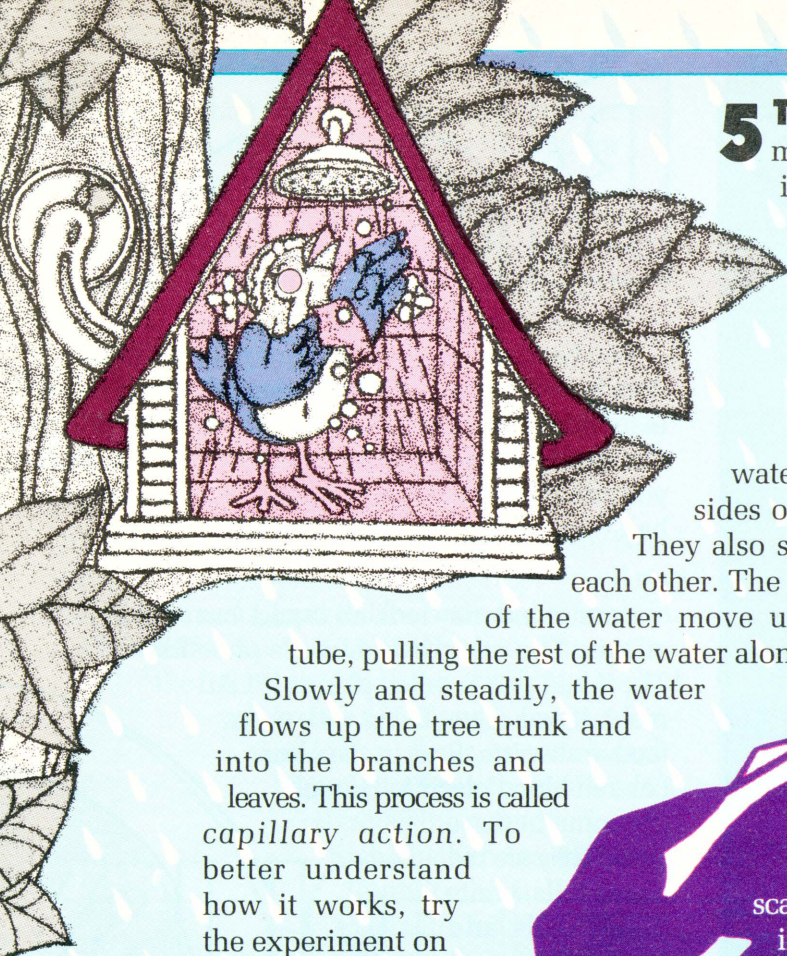


**3 True** If you swim in a pool, you know about chlorine. This chemical makes a pool smell the way it does. It also makes your eyes bloodshot when you open them under water. What is healthy about bloodshot eyes? Nothing. But disease germs are even more sensitive than your eyes. The chlorine kills germs. That keeps you from catching a cold from other swimmers. It also keeps the swimming pool fresh and clean.

**4 True** Think about what happens when you brush your teeth. You turn on the faucet to wet your toothbrush. Then you brush and brush. Meanwhile the water runs and runs. That's a gallon of water down the drain. Water is a natural resource. Like all the others, it shouldn't be wasted. So don't be a drip! Turn off the water while you brush. Then turn it back on when it's time to rinse. Okay







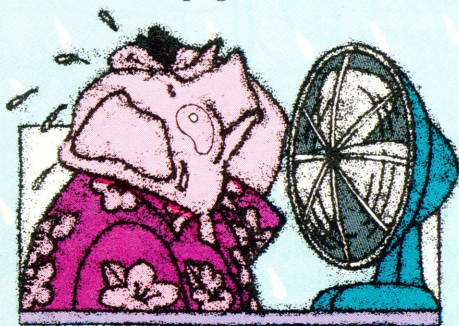
**5 True** The wood of a tree may look solid. But inside, it is made up of tiny tubes that are too small to see. When connected, some of these tubes can be 30 feet tall. Water is brought into these tubes by the roots of the tree.

These tiny bits of water stick to the sides of the tube.

They also stick to each other. The edges of the water move up the

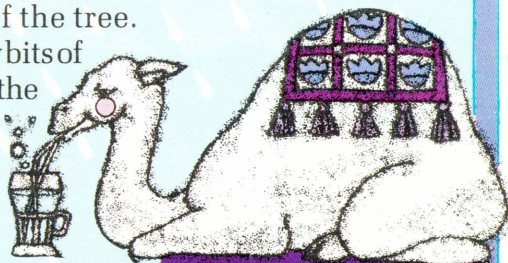
tube, pulling the rest of the water along.

Slowly and steadily, the water flows up the tree trunk and into the branches and leaves. This process is called *capillary action*. To better understand how it works, try the experiment on page 36.



**7 True** You usually feel hot and sticky when you sweat. But actually the sweat is helping to cool your body. As your body heats up on a hot day, some of the sweat evaporates. When it goes into the air, it takes heat from your body with it.

But there are some days when sweating doesn't cool you off as well. That happens when the weather forecaster says that the air is already holding a lot of moisture. There isn't room for much more. So, on days like that, you can't really get cool. You just stay sweaty.



**6 False** We told you some questions were tricky! It is true that camels can go without drinking water for over a week. But there are other desert animals that also have learned to live where water is scarce. The champ when it comes to not drinking is the pack rat. These little desert animals never drink! Every drop of water they get comes from the food they eat. You get some water from food, too.

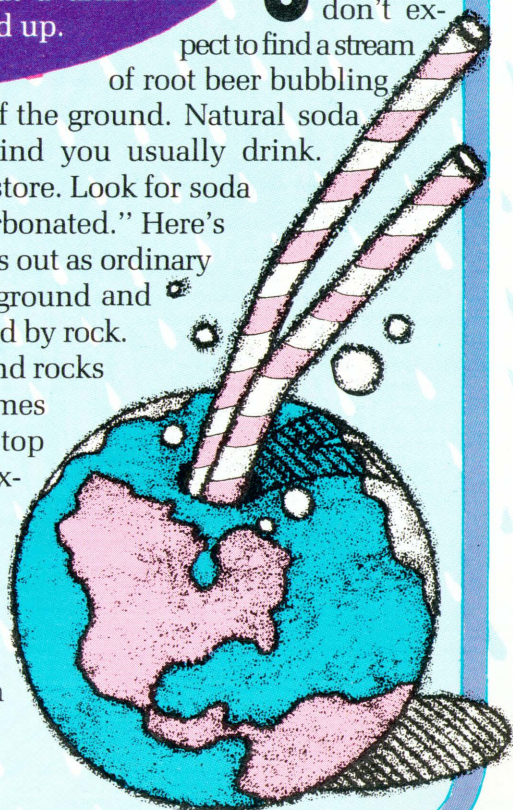
But don't try to live like a pack rat. Three days without a drink and you'd be all dried up.

**8 True** But don't expect to find a stream of root beer bubbling

out of the ground. Natural soda

water is different from the kind you usually drink.

Sometimes you see it in the store. Look for soda water that says "naturally carbonated." Here's how it is made. The soda starts out as ordinary rain. But when it falls to the ground and soaks in, the water gets trapped by rock. Minerals from the underground rocks dissolve in the water. Sometimes the pressure of all the rock on top of the water forces carbon dioxide gas into the water, too. When people drill wells and bring the water to the surface, the carbon dioxide comes out of the water in bubbles, just like regular soda. Natural soda water has a zingy taste. But orange or cherry flavors? No way!





# Blood

by Phyllis Keaton

You have two and a half quarts of blood inside your body. But this red liquid doesn't splash around inside you like soda in a can. It travels through thousands of miles of tubes, called blood vessels. If you could stretch them out, these tubes would go half way around the world. No kidding!

## In Your Blood

Your blood may look all liquid, but only half of it is. The other half is made of solids. The liquid part is called plasma (PLAZ-muh). Blood solids, along with water, food and waste, float in the clear-colored blood plasma. The solids come in three parts. They are red blood cells, white blood cells and platelets. Each part has an important job, as you will find out later.

Here's a fact that would make Count Dracula's mouth water. In one drop of blood, you have five million red blood cells, 8,000 white blood cells and 350,000 platelets.

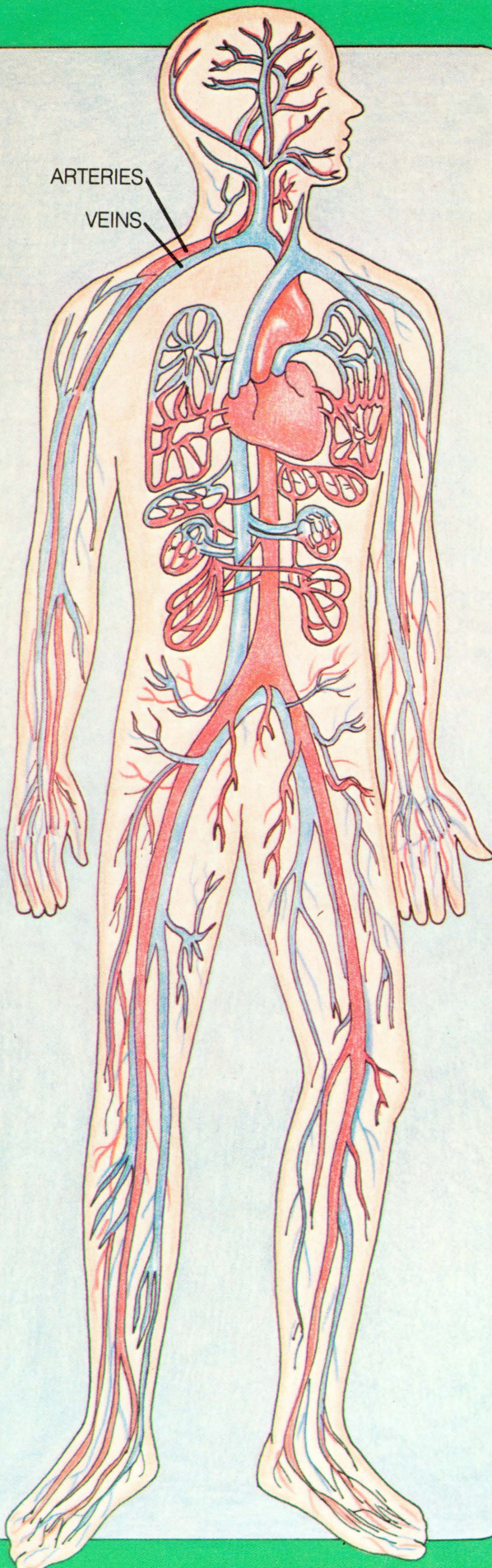
Your red blood cells do not live very long—up to five months. Your white blood cells live an even shorter time—only a few weeks. But don't worry. Inside your body are blood-making factories. The soft stuff in the center and ends of your bones, *marrow*, is always making new blood cells. So, as some blood cells die off, new ones are always being made. Your marrow also produces all the platelets you need. Whew!

## Bloodlines

Now you know where your blood is made. But how does it get around? Your blood is carried by three kinds of blood vessels: arteries, veins and capillaries.

Arteries carry blood away from the heart. They have thick walls to withstand the pressure of your hard-pumping blood.

Veins bring blood back to the heart. They have



# BUSY BO



thinner walls than arteries. They also have little trap doors, called *valves*. These keep the blood from flowing in the wrong direction.

Capillaries are small, hair-thin vessels. Some of them are so narrow that red blood cells must travel through them in single file! Capillaries have to be that small. Food and oxygen must be able to pass through them into the rest of your body.

The capillaries bring materials to and from every single part of your body. So there are many more miles of them than there are arteries and veins.

## Take a Fantastic Voyage

How does your blood travel through all your blood vessels? Why not come along for the ride? You'll start in the heart, travel all around the body and back again.

**Thump Thump** Don't be frightened. You are in the right side of the heart. The blood around you is dark red. It needs oxygen. Prepare to drop down into the blood vessel that leads to your lungs. It is called the *pulmonary artery*.

**Sigh** That's the sound of breathing. You're in the lungs. Here the red blood cells give up their load of carbon dioxide, one of the waste products in your body. The red blood cells also take on a fresh load of oxygen. The oxygen turns their color into a bright red.

**Zip!** From the lungs it's through a vein into the left side of the heart.

**Splush** You have entered the main artery leading from the heart—the *aorta* (ay-OR-tuh). You are on your way to supply oxygen and food to the whole body.

**Squeeze** You're in the hair-thin capillaries. Your blood delivers food and oxygen to the cells. It also removes carbon dioxide and other wastes. You leave the capillaries and . . .

**Whoosh!** Enter a vein. The blood rushing behind you pushes you forward. Small muscles squeeze and keep you flowing. Valves make sure you go in the right direction—toward the heart.

**Plup** You're back at the beginning, in the right side of the heart.

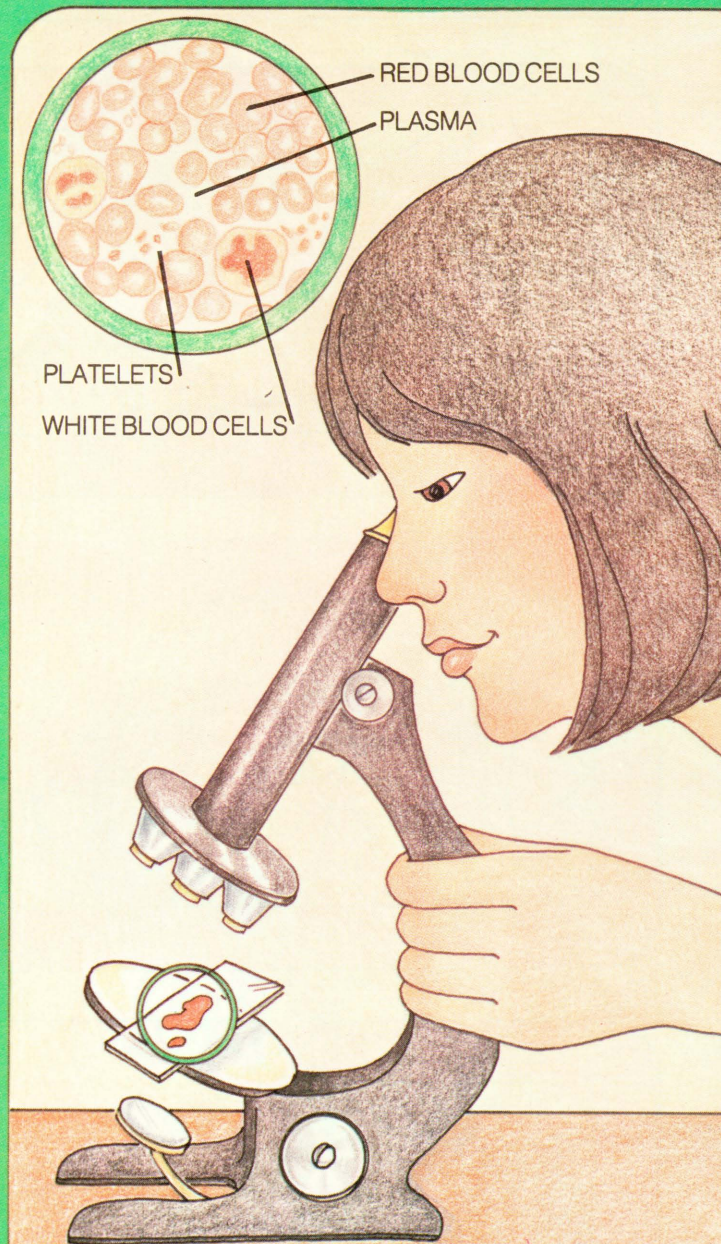
## Not Your Type

Everybody's blood looks the same. But all blood is not exactly alike. There are four kinds: A, B, O and AB. They don't appear to be any different from each other. The only way to tell which kind is which is

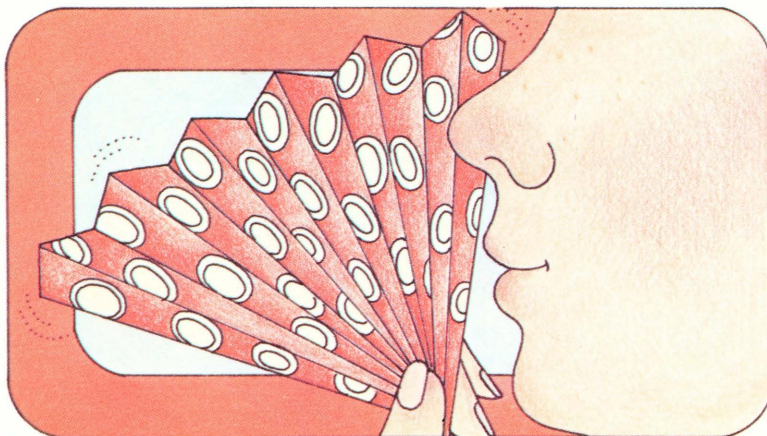
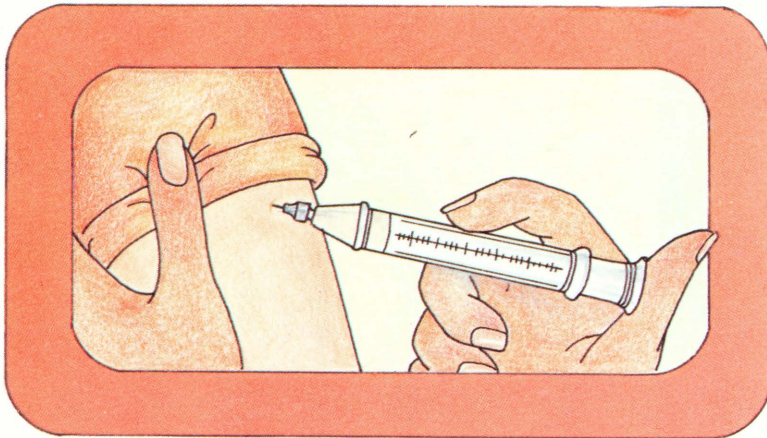
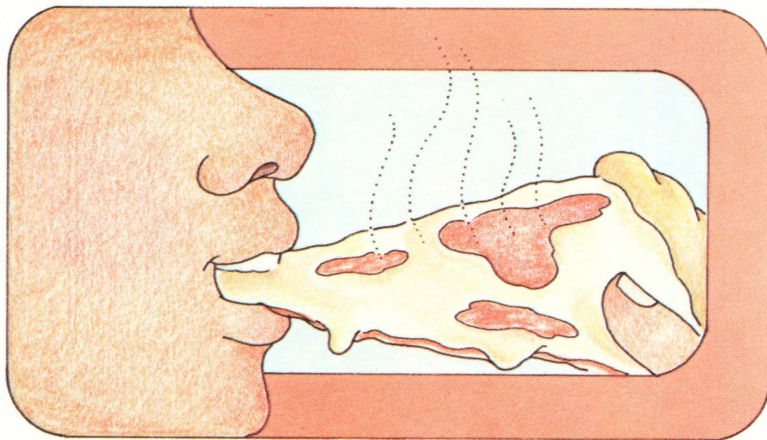
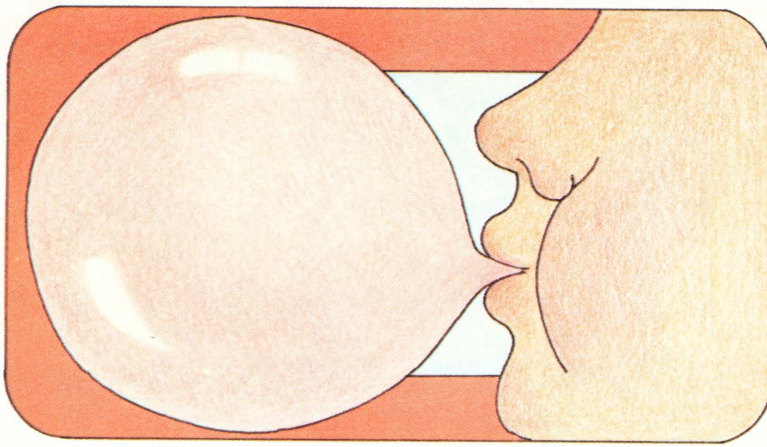
through a chemical test.

It's very important to know the difference when someone needs blood. When certain types of blood are mixed, the red blood cells clump together. If the wrong type of blood is put into a person's body, the blood will clot. This could be very dangerous. So before doctors give anyone blood, they must check her blood type.

dies







## Bloody Jobs

**Blood Helps You Breathe** Take a deep breath. Know what's happening? Oxygen is passing from the lungs to your bloodstream. Red blood cells contain something called hemoglobin (HEE-muh-globe-in). It combines very well with oxygen and gives blood its red color. Hemoglobin gets fresh oxygen from your lungs. Then it delivers a supply to your body's cells.

**Blood Helps You Eat** After you eat a pizza, your stomach and intestines digest it. Once food is broken down, you need a way to carry the nutrients all over your body. The blood in your capillaries can do the job. Through those tiny vessels, food travels to wherever it is needed.

### Blood Keeps You Healthy

When you were young, you probably got a shot of measles vaccine (vak-SEEN).

A vaccine gives you a small, weak dose of germs. But don't worry. It's not enough to make you sick. It's just enough to give you the ability to fight a disease.

The germs from the vaccine get into your blood. There, your white blood cells learn how to fight them. The next time germs get into your body, the white blood cells go to work. They send out chemicals called antibodies to clump the germs together. Then they surround the germs and keep them from spreading. If the germs don't spread, you don't get sick.

**Blood Keeps You Cool** When you exercise or get hot, the capillaries in your skin get wider. More blood flows to the surface of your body. Your body gets cooler as heat from the blood escapes into the air. When you're cold, the capillaries get narrower and tighter. This keeps in more heat and you stay warm.

# BUSY BO



## The Clot Thickens

If you cut yourself and start bleeding, it means you cut some of your blood vessels. Lucky for you, all your blood doesn't pour out. Before that can happen, fibrin (FIE-brin) comes to the rescue.

Fibrin is made of tiny threadlike material. It spreads out over your cut. These tiny threads make a net which traps the blood cells. The net is a kind of plug, called a **clot**. It prevents more bleeding.

As a blood clot dries, it forms a scab. You know how people always tell you not to pick a scab? They are right. The scab is there to protect you. While your cut heals, the scab covers it.

No germs can get in and no more blood can get out. When your skin has completely healed, the scab's job is done. It falls off. Underneath is some smooth, new skin.

### Yuck!

When you get a cut, germs get into your blood. The white blood cell is one of the weapons your body has for fighting germs. The white blood cells surround the germs. They attack the invaders.

During the fight, some white blood cells get killed, too. When the fight is over, there

is a mess of dead germs and white blood cells. This mess is called **pus**. It's the thick, yellowish, yucky liquid you sometimes see when you have a cut that is healing.

## Bloody Nose

Your nose is full of capillaries, those small, thin blood tubes. They can break very easily. If you hurt your nose, the tiny tubes are likely to get broken and you are likely to get a nosebleed. You may even get a bloody nose by blowing your nose too hard.

Usually, a nosebleed will stop itself by clotting.

Here are two tips to help the blood clot faster:

1. Hold an ice cube on your nose.
2. Hold your nostril shut for a couple of minutes.



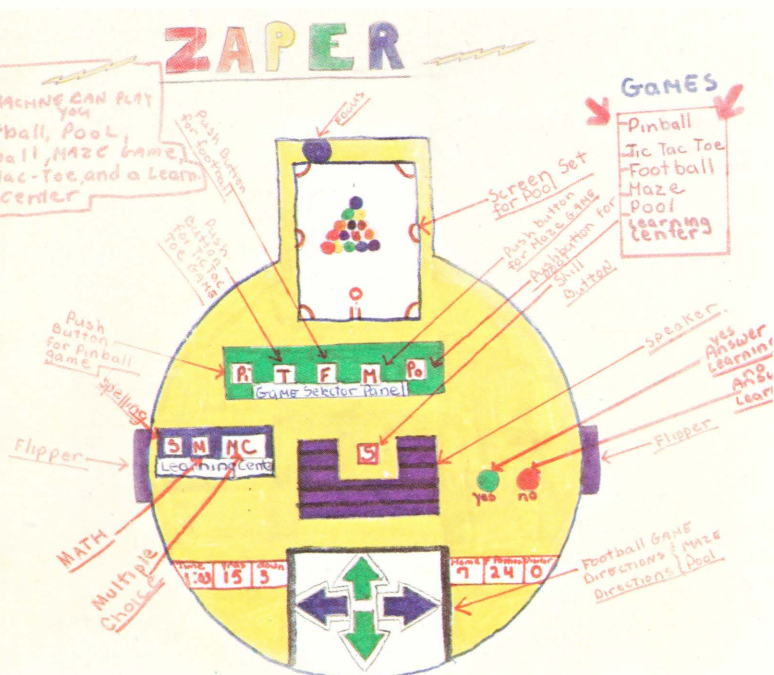


# MAIL

## Toys of the Future

Thanks for sending in all your great pictures.

Here are our favorites:



**Randi Wiener**, Miami, FL.

The Zaper is a computer toy that can play football, pool, pinball and tic-tac-toe with you.



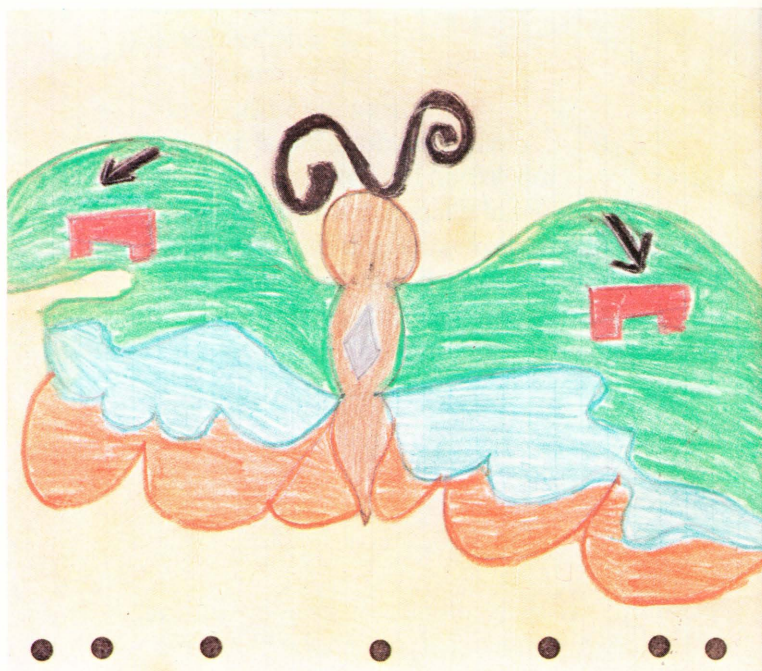
**Brian Endersbe**, Scottsdale, PA.

Brian's robot, Super Ugh, can walk, talk, fly, clean up the house and play all kinds of games.



**Jenni Reeves**, Levittown, PA.

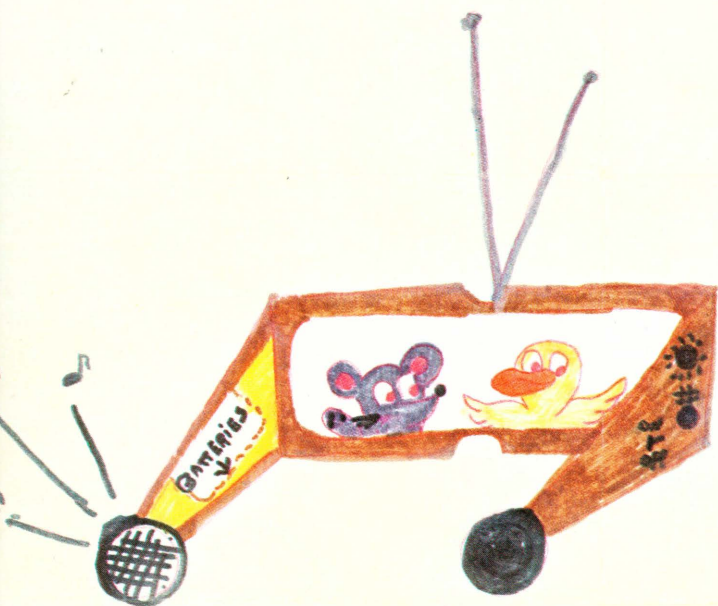
With Jenni's Fun Goop Machine, you can make toy animals, plants and spaceships.



**Lori Jennings**, West Palm Beach, FL.

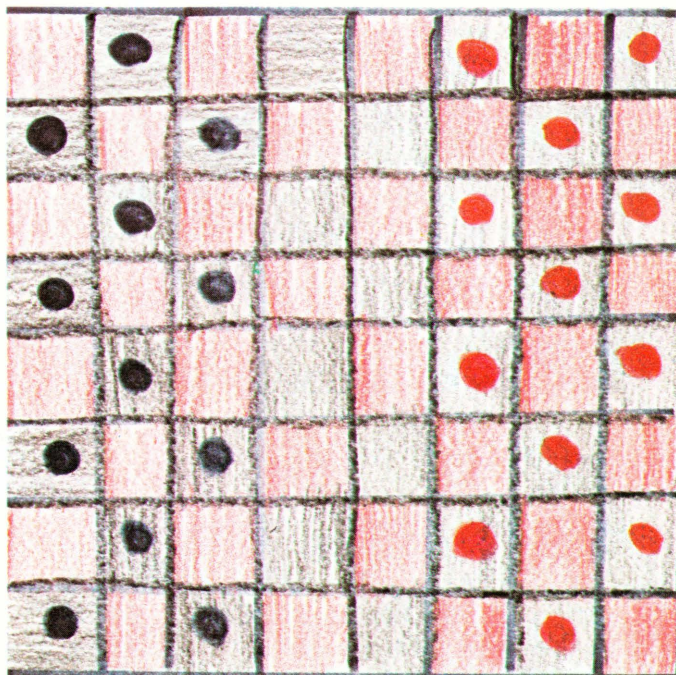
The Take Me Butterfly will obey your every command and fly you wherever you want to go.





**Joan Crosier**, Huntington, MA.

You can watch cartoons any time you'd like with Joan's TV glasses. They also play music.



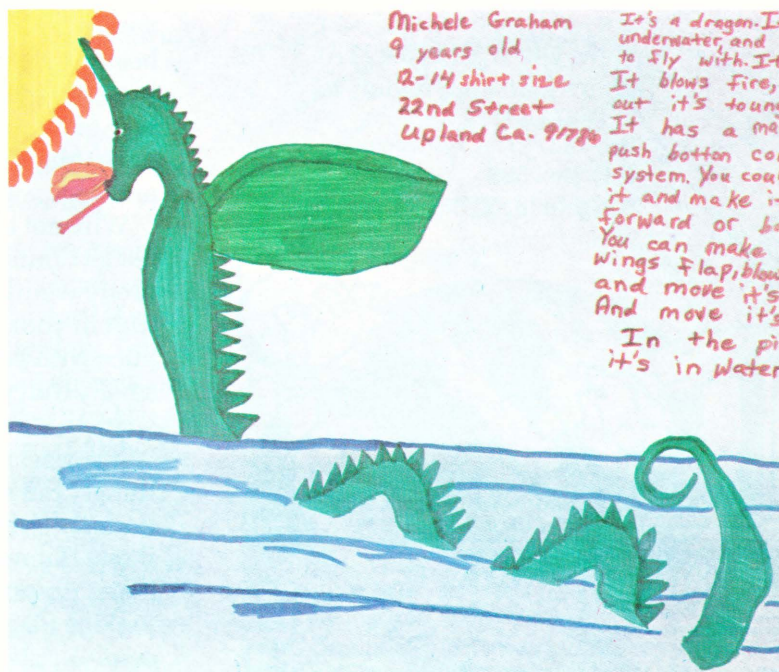
**Mary Ellen Sloane**, Pacifica, CA.

In Think-tac-toe, both players wear headsets. The pieces are moved around the board by their thought waves.



**Heidi Owens**, Durham, NC.

Heidi's toy is the Weeple. You can ride on it and it will protect you from harm.



**Michele Graham**  
9 years old  
2-14 shirt size  
22nd Street  
Upland Ca. 91786

It's a dragon. I  
underwater, and  
to fly with. It  
It blows fire,  
out it's toun  
It has a me  
push botton co  
system. You co  
it and make i  
forward or b  
You can make  
Wings flap, blow  
and move it's  
And move it's  
In the pi  
it's in water

**Michele Graham**, Upland, CA.

Michele's fire-breathing toy dragon flies and also swims underwater.



Here are some books to read and things to do and see after you finish reading this issue of 3-2-1 CONTACT.

## Weird Yellow Cars!

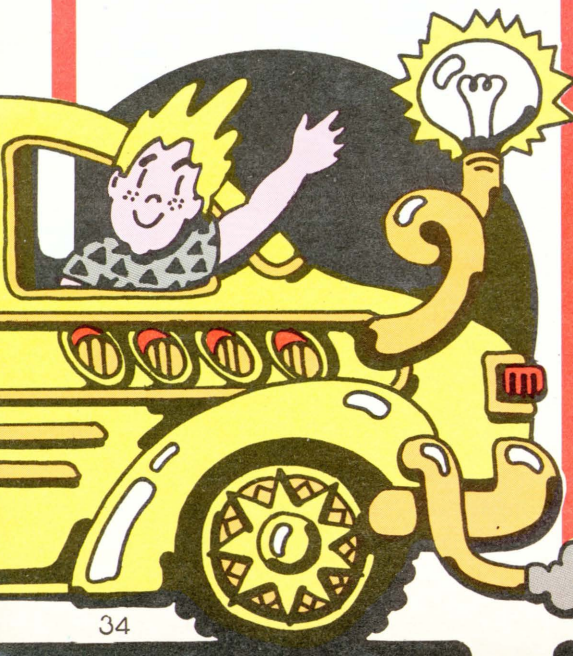
This review was sent in by Toby Wood, Fountain Valley, CA.

I went to the Children's Museum in Los Angeles, California. It was so much fun. You can see a Lego exhibit, an old piano, a three wheel motorcycle and a weird yellow automobile. They also have a souvenir shop.

My favorite thing was the TV station upstairs. You can make up your own news shows. The rest is great, too.

Have you gone to a museum lately? Write and tell us about it. Send us a story that is 100 words or less. If we use your review, you'll get a CONTACT T-shirt. Send your review to:

**3-2-1 CONTACT: Museums**  
P.O. Box 599  
Ridgefield, NJ 07657



## Butterfly Feeder

In the *Contact Report* you read about butterfly farms. If you would like to see some of these beautiful bugs this summer, try to attract them. There is no sure way of doing this. But it helps to have things around that smell and taste good to them.

Why not build a butterfly feeder? Butterflies will eat some pretty weird stuff. Put rotten fruit in your feeder. Or mix juice with yeast to make a smelly fruit punch. It's the strong smell that attracts butterflies.

If you set up a feeder and a hungry butterfly is in the neighborhood, it might stop to check it out. But remember, butterflies aren't the only insects that are looking for a tasty meal. So be careful. After all, you don't want to get bugged by a buzzing bee!

## 3-2-1 CONTEST

This month's contest is easy to enter. All you have to do is eat. Here's what you do:

Starting in the morning, write down everything you eat in a day. There's no right or wrong list of food. So be honest! How many pieces of bubble gum did you chew? Did you have catsup or mustard on your hamburger? Don't leave anything out. Tell us what you ate and how much.



Send us your list, along with your name, address and T-shirt size. We will choose several lists for a story on food. If your list is one of them, we'll send you a CONTACT T-shirt. Mail your list to:

**3-2-1 CONTACT: Food List**  
P.O. Box 599  
Ridgefield, NJ 07657



# Previews



## Rubber Gum?

In *Any Questions?*, you learned a little about rubber. You can find out more by sending for "Rubber: A Product of Nature and Science." This color poster shows how rubber is made from tree sap or chemicals. You will also find out that rubber is a part of some unexpected things—like chewing gum! To get your free copy of this poster, write to:

Department of Public Relations  
Firestone Tire & Rubber Co.  
1200 Firestone Parkway  
Akron, OH 44317



## Keep on Skywatching

This issue of *CONTACT* contains your last *Skywatch*. Replacing it will be a new feature, all about the planet Earth.

You can keep learning about space. There are lots of good books for skywatchers. Here are three you might look for:

**How Did We Find Out About Outer Space?** This book by Isaac Asimov is a history of space exploration. You will read about everything from hot air balloon flights to the first walk on the moon. This book is published by Walker and Company.

**Galaxies: Islands in Space** The stars you see are part of our galaxy, the Milky Way. But there are billions of other galaxies in space. David Knight explains the mystery of these galaxies in his book. It is published by William Morrow and Co.

**The Nine Planets** If you enjoyed reading *Skywatch*, you will love this book by Franklyn Branley. It has loads of information on the nine planets. It also tells of the search for more planets in our solar system. The book is published by Thomas Y. Crowell.



## Good News, Bad News

Summer is the time for baseball, picnics and playing outdoors. But it's also the time for poison ivy and sunburn!

"First Aid Facts" is a free poster. It has all the information you need for a safe summer. To get it, send your name and address to:

Johnson & Johnson  
Consumer Affairs Department  
501 George Street  
New Brunswick, NJ 08903

Ask for "First Aid Facts."



# Experiment

## Go with the Flow

In this month's *CONTACT* Quiz you read how water can sometimes flow up. Here's a chance to see for yourself. At the same time, you'll learn something surprising about black ink.

### What You Need

glass jar	black felt tip marker	water
pencil	white paper towel	tape

### What You Do

1. Pour some water into the jar.
2. Cut out a strip from the paper towel. Tape one end of the paper strip to the pencil.
3. Make a black dot about one inch from the other end of the strip.
4. Lay the pencil across the top of the jar. The strip should just barely touch the water. Make

sure you don't have too much or too little water.

5. Wait a few minutes and see what happens to your "black" dot!

### Why It Works

Your paper is made of tiny fibers. As water touches them, bits of water attach to the fibers. The water slowly moves up the piece of paper, pulling along more water as it goes. That's the same thing that brings water up a tree—*capillary action*.

When the water reaches the black dot, something else begins to happen. Black ink is really a combination of different colored chemicals mixed together. Water breaks up the ink. It causes the chemicals to become separate again. They *dissolve*.

The different colors separate in water. Then capillary action carries them farther up the paper strip. But each colored chemical dissolves at its own speed. The ones that dissolve first get a head start and are carried higher up the strip. Slower colors start later and remain near the bottom.

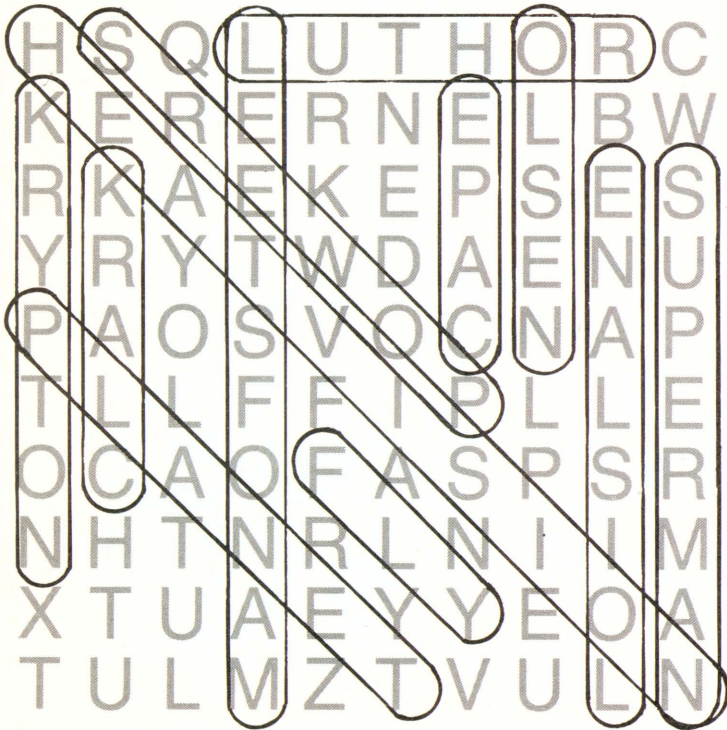
Some black markers are specially made so that their ink won't dissolve in water. If your pen is one of them, you won't see any colors. So try the experiment again using a different kind of marker.





# Did It!

## Word Hunt (page 24)



### Coming in September!

Starting next month, CONTACT will bring you two new departments.

### Poster!

A colorful two-page poster that you can hang on your wall.

### Earth Works

A close-up look at the world's wonders. We begin with volcanoes.

## OOPS!

On page 6 of our May 1981 issue, we told you that the schist, the oldest rock in the Grand Canyon, is 200 billion years old. We goofed! The rock is really 200 *million* years old.

### Credits

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## Next Month!

Here's a sample of what you'll find in the next issue of 3-2-1 CONTACT:

### Ice Cream

CONTACT takes you to an ice cream factory to get the real scoop on how it's made.

### Sea Turtles

Learn how scientists are trying to save some from disappearing.

### Sneakers

Find out about the history of America's favorite foot wear!

**Plus Factoids, Earth Days, Timeline, List of the Month and Much More!**



# Enjoy Sesame Street

For Ages 2-6



**Sesame Street Magazine** — Big Bird and his delightful friends will bring dozens of playful surprises, ten terrific times a year. (It's the entertaining education that Sesame Street does best!) Puzzles, cut-outs, games, A-B-C's, 1-2-3's....there's all the magic of the TV super-series in every colorful issue.

# Entertain with The Electric Company

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**The Electric Company Magazine** — as creatively entertaining as the T.V. show kids love. It's amusing, playful, absorbing and educational for beginning and young readers.

Enjoy ten colorful issues filled with puzzles, posters, cut-outs, Spidey super stories, jokes...and sunny smiles.

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Subscriptions to Canada add \$1.00 per year; other countries add \$2.00 per year. Please remit in U.S. currency. Allow 4-6 weeks for delivery.

**MAIL TO:** Sesame Street Magazine  
P.O. Box 2894, Boulder, CO 80322

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ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

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**MAIL TO:** The Electric Company Magazine  
200 Watt Street, P.O. Box 2922, Boulder, CO 80322


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# Skywatch

## Skyfacts: Rings of Saturn


 Saturn isn't the only planet that has rings. They have been found circling Jupiter and Uranus, too.


 No one knows exactly how Saturn's rings were formed. Some people think the particles are leftovers from the time when Saturn and its moons were first formed. Others think the particles are pieces of a moon that once orbited Saturn. Somehow, that moon got too close to Saturn. When that happened, the force of the planet's gravity ripped it apart. The pieces that now make up the rings are what is left of this ancient moon.


 For a long time scientists thought Saturn had only two main rings. That was all they could see. As new, more powerful telescopes were built, they got better views of Saturn. Two more rings around the planet were found.


But the biggest surprise came when Voyager 1 flew by Saturn. It sent back new information that really shocked scientists.


As the spacecraft approached Saturn, the scientists began to see seven main rings—the A, B, C, D, E, F and G rings. When Voyager got even nearer, close-up pictures showed that these rings are made of many smaller ones. So now, scientists say Saturn has hundreds of rings—maybe even thousands!


 Saturn's rings appear to be red, tan and brown.

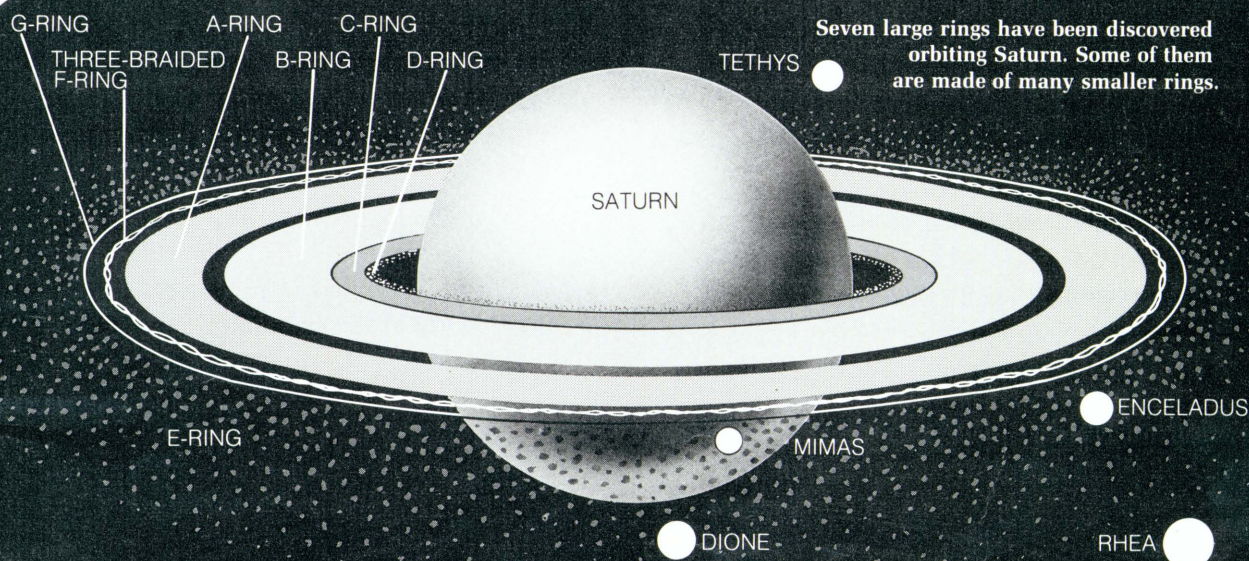
 When seen through telescopes, Saturn's rings look solid. Actually, they are made of billions of pieces of ice and ice-covered rock.

 The pieces of ice that make up Saturn's rings come in many sizes. Some are larger than a house. Others are as tiny as grains of dust.

 The rings are always moving. They spin around the planet's equator at speeds of up to 800 miles (1,290 km) per hour.

 Saturn's rings circle the planet in a wide orbit. The distance from one edge of this orbit to the opposite one is 170,000 miles (274,000 km).

 At their thickest point, the rings measure two miles (3.2 km) from top to bottom.







**Skywatch**

## Focus on the Rings of Saturn

Most people know that Saturn has rings. But hundreds of years ago the rings were big news. The astronomer Galileo first saw the rings in 1610—but he didn't know it. Through his weak telescope, Saturn appeared to have a moon on each side of it. Some people even said Saturn looked like a planet with two giant handles!

The puzzle was solved by another astronomer,

Saturn may have hundreds of rings.

Christian Huygens, nearly 50 years later. He had a stronger telescope which could see Saturn more clearly. He told the world about the first planet with rings.

Since then, many discoveries have been made about Saturn's rings. The most exciting came in 1980 when Voyager 1 sent back the clearest pictures ever of the rings. But hold on. It's not over yet. More discoveries may come this August. That's when Voyager 2 will give people a second close-up look at the ringed planet.

(continued on page 39)